Data Talks #4 - Data for Climate

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TEXT

Hello, welcome to Data Talks. Today I would like to apologize for our technical issues, we are a little bit late, but still we're going to have a great talk today.

It is not as if we're not warned about it, the temperature of the planet is increasing and this will bring harmful consequences for societies all over the world.

Throughout History humans have built cities according to natural resources and availability of good conditions, such as water and temperature for food production. With the increase of the Earth temperature, all of this is about to change. Natural phenomena, such as the rains in Germany and the dry in Brazil, both of which happened this year, will be more often and less predictable. We might be talking here about human extinction.

Since 1992 governments all over the world are developing climate governance in which agreements and goals are settled to avoid drastic increase of the planet's temperature. Meanwhile civil society movements, such as Fridays for Future, claim that national governments are not making enough.

Data was always an asset for Science and now governments and citizens need to learn the language of Science. How can public data help local and national governments to create strategies to fight the climate crisis? And can the civil society herself produce and use this data today?

We have two very special guests to talk about this with us: From Brazil, we have today Milena Ponczek. Milena is an atmospheric scientist working on the interaction of volatile organic compounds with atmospheric aerosols, air quality and climate. She holds a degree in Chemical Engineering from the State University of Campinas in Brazil, a PhD in Chemistry at the University of Lyon, France. She is also a former postdoctoral researcher at the Laboratory of Atmospheric Physics at the University of São Paulo where her work was focused on better characterizing aerosol life cycles in the Amazon region and understanding the impacts of deforestation and biomass burning on the atmosphere.

Beyond the context of her technical work, she is interested in socio-environmental issues and how to create bridges and interaction between so-called “hard” sciences, and social and economic sciences, in order to make scientific and technological advances approach society. She is one of the producers of the Atmospheric Tales podcast that covers themes related to air pollution and climate change. Milena, thank you very much for being with us today.

DRA. PONCZEK: Hello, hi Jessica, hi Thomas and everyone. It's a pleasure to be here today with you.

MS. VOIGT: And from Germany we have today Dr. Thomas Bartoschek. I'm going to say this again: Dr. Thomas Bartoschek. Thomas is a postdoctoral researcher at the Institute for Geoinformatics, University of Münster and Co-Founder and CEO of the edtech Start-up re:edu since 2018 and of the non-profit openSenseLab since 2021. Thomas holds a PhD in Geoinformatics he received from IfGi, in 2017. His research interests are in Geotechnologies for spatial learning, human - computer interaction, Citizen Science, Digital Education and Daily Literacy. During his career, he investigated and developed various technologies for Citizen Science and digital learning with Sensebox and OpenSense Maps being the most prominent. He has experience in leading various research projects on a national level, and received several awards for his work, most relevant is the ACM Eugene L. Lawler Award for Humanitarian Contributions within Computer Science and Informatics, in 2013.
Thomas, thank you very much for being with us today.

DR. BARTOSCHEK: Thanks a lot, Jessica, for the invitation. Hello, Milena. I'm really happy to be here, looking forward to the talk.

MS. VOIGT: So, this is one of those talks that I hope I'm not going to talk too much. I'm going to post a really simple question, first to Milena. Could you explain to us what are the general strategies to fight climate change?

DRA. PONCZEK: Hello again. So, Jessica, you first made an excellent introduction to the topic, so, moving forward.
First, giving some, let's say, “basic concepts” related to strategies to fight climate change: we know it's a systematic and global vision that challenges, that affects all layers of any spheres of our society, globally, and of course, such a big challenge doesn't have a simple solution. Currently, some of the strategies and concepts related to tackling climate change, I would say, are mitigation. Talking about mitigation I'd like to precisely describe what is a mitigation: the definition of the IPCC - which is a theoretical guide for climate change issues. So, basically, mitigation is any kind of intervention to reduce the sources or enhance the sinks of greenhouse gasses. So, it's basically trying to avoid releasing greenhouse gasses to the atmosphere and, meanwhile, we have to invest in mitigation policies.

We also have to invest in adaptation, that it's a different concept. “Adaptation” is the process to adjust to the actual climate or to adjust to future effects in climate changes: temperature rising and all kinds of effects that climate change will bring to our society, so cities and natural systems as well.

I think another concept that is pretty important nowadays is the concept of resilience, that it's pretty much in the debate right now. “Resilience” is the capacity of all kinds of systems and, let's say, the social, economic and environmental systems to handle hazardous and extreme events. So, responding well to those extreme events, that climate change is putting us to face and maintaining so, constructing a way of tackling and to support, and to handle all these extreme events of climate change.

So, moving forward some strategies, to put them into practice it's very important to know from where the greenhouse emissions are coming from. We can't think about how to solve a problem if you don't measure, if we don't quantify and monitor the sources and sinks of greenhouse gasses. It's extremely important that all sectors and activities that release greenhouse gasses, they monitor, quantified and invest in measuring, in doing what we call “emission inventories” to know exactly what kind of process, what kind of activities are meeting mostly of greenhouse gasses and other kind of pollutants as well, because of course climate change is pretty related to the greenhouse gas emissions, but if you think in a more holistic approach, we can also tackle other environmental issues, such as air pollution, or water pollution or also the loss in biodiversity… All kinds of issues are related, and have also common solutions: common problems and common solutions.

What else?

MS. VOIGT: Yeah, it's quite interesting that I’ve never heard about… I'm not from the field, so I'm putting myself in this debate as a normal citizen who reads the newspaper, the Brazilian ones… So, not so long ago and the words “mitigation”, “adaptation” and “resilience” are quite new for me. I heard them recently, during the Cop26 discussions. And I think when you talk about the holistic approach, we're talking also about, for example, the decision of reducing the emission of methane, instead of only CO_2, because the methane would also be harmful, but it's easier to recover its impact once it is not released anymore. Am I saying this right, or am I saying something wrong?

DRA. PONCZEK: Yeah, so methane is one of the greenhouse gasses. What is the main difference between CO_2, carbon dioxide and methane? So, methane is what we call short-lived

species, so it's a gas that has a much shorter lifetime in the atmosphere, because CO_2 has a very long lifetime, around 100 years and methane has a much shorter lifetime. In this way, since we decrease the emissions, the impacts and the effects of reducing these emissions are also few. So, the positive impacts of reducing its emission are much easier and faster to observe.
Another interesting information is that CO_2 is our main greenhouse gas, because it's the most abundant one and also because of its very long lifetime, but there are many other greenhouse gasses, such as methane that was in the discussion of Cop 26. There are also neutral oxides and also the CFCs, that are a known problem, because they are also Ozone depletion species that are, at the same time, also greenhouse gasses.

MS. VOIGT: Thank you for this explanation. I think we're going to come back to it, I feel, a bit later.
I would also like to invite Thomas to this round and ask him about your experience with Sensebox and OpenSense Maps. You produce data from civil society, also to help inform civil society and maybe other actors.
I would like to learn about what you're doing and if you could explain this more to our audience.

DR. BARTOSCHEK: Yes, I'm glad to do that, Jessica, thanks a lot.
So, first of all I'm really happy that Milena is with us as an expert, and I really couldn't put it in words as I'm also not from the field I'm from Geoinformatics, so usually I start there, where the data comes in here.
I'm not from Atmospheric Sciences or Climatology in general, so I'm really happy, thanks Milena for this great introduction. And Jessica, as you said, we have a project here, at the University of Münster, that we've started and in our Startup now, the Sensebox, as you mentioned, which is a device we have designed and developed here in our Institute for Geoinformatics. First ideas started 10 years ago, more or less, where we worked with high school students in small projects to, basically, teach them to code and to work with sensors and with environmental data. This was the first aim here and we started to do that with different approaches and came across possibilities to let them work with a microcontroller. A small device connects sensors and lets them code this microcontroller to learn how to program, basically. And then, they tested their devices: they went out of the building and measured data.
The first thing they liked to measure was temperature data. Yes, air temperature and humidity, so already some ideas of phenomena that are of course closely related to climate change. And by doing that we found out that it's pretty motivational: to have this hands-on activity building a

device, programming it and then having some data with it… We said “okay, when the data is appearing, data is coming in, it would be interesting also to keep the data and to make it available openly.

So we started immediately to develop a platform called OpenSense Map where the data was going to, basically, this device. So, at first, we had to make these devices able to connect to the internet and send the data to this platform. This was the idea, some kind of an ecosystem that was born with that time, with a toolkit, a “do-it-yourself” toolkit, where kids, but also citizens, can build their own measurement device. After posing their own question about the environment, they are able to code, to program this device depending on the question, depending, maybe, on the intervals of how often they want to measure, or what they want to measure, in general. Then, having the possibility to really publish the data they are gathering and make it openly available for everyone. So, it was somewhat the whole scientific process that is necessary here, putting into a nutshell basically, from the question to designing a device collecting the data, programming the device, collecting the data and publishing the data, to be able to, maybe, answer the question.

And the questions, maybe, just to close here, the questions can be very, very broad, yeah, it can be a general question, collecting just continuously temperature data which now, I said, we started nearly 10 years ago, so it's a short term in the climate change topic, but still it is possible we see that the years, every year, are getting warmer, so we already can see these things already from the data here. This was basically the starting point for Sensebox and OpenSense Maps.

DRA. PONCZEK: If I may add something, just a comment.

First, congrats for the project, it's very interesting, it's very important because… so, taking the lead of the first question Jessica asked me, I forgot to mention a very important strategy for fighting climate change, that is “capacity building”.

It's, again, another term that is pretty much in the debate, which means, basically, training, informing, having people trained to tackle their problems and one of the first steps for having people to feel and to be into action is to have their information and once you are acquiring data, acquiring your own information, you can approach people and kids and, let's say, civil society to the problem. So I think it's wonderful to have this kind of project.

MS. VOIGT: When we were researching about this episode, I need to say that I fell in love with this idea, because I’m from the transparency field of the public procurement, mostly, so we talk

about how money is spent and there is this big difference in the environment, in the environment of civil hacker in Brazil and Germany. In Brazil there is a lot of interest in public procurement, public spending, because we have our problems, and here in Germany I saw in Hackathons, in open knowledge labs and other parts where I had contact with society hackers.
The main focus here is in climate change and in the climate crisis and how to measure, how to avoid or how to bring something new that, maybe, the public policy is not being able to develop.
So, the OpenSense Map puts all of this information, and all of this data, because data is not only about information, there is a way that we can measure, we can compare, we can cross. So I thought it was sensational.
And I have two more questions about the the SenseBox that I didn't hear and I would love to hear: I saw that you have the “boxes” all over the world, I'm really curious to know how you could spread so much, because I saw they are in all continents and this is quite amazing. And if I understood it right, every single person who acquires, or an organization, or group who acquires the boxes, he or she can set up what is going to be measured. Or all of them are now measuring the same things? Could you explain this a little bit better?

DR. BARTOSCHEK: Of course, of course I will. So, the SenseBox and the OpenSense Map are, in fact, two things that interact very well with each other, but they can both be seen completely individually, so maybe I will start with the OpenSense Map as one platform and the name says it already: it's open. Open in terms of the data which is available there, it is open data, which was our main intention here. But also it's “open” for the device that connects to the platform, and sends data to and “open” to all kinds of phenomena. So it's about environmental phenomena. And it may be temperature, but it also may be radioactivity, or it may be pictures of the number of birds that come into your garden, if you have a sensor, a camera, that would measure that. You could. You can and people do that, they use the OpenSense Map and it's open for the devices.
So we started it. First we connected our SenseBox to OpenSense, so they communicate with it, but then people, civil hackers, as you mentioned Jessica, started to recognize the platform and use their own devices, and connect them to the platform. So, the devices connected are not only SenseBoxes, but there are other devices as well. So this is also the case, that a lot of the devices registered on OpenSense Maps come also from different projects, or just “do-it yourself” devices from civil hackers, or citizen scientists that just want to contribute.
And as OpenSense is also open to all kinds of phenomena, either Sensebox or other devices can be configured depending on the question you have. We have with Sensebox some kind of a

standard set of sensors saying temperature, humidity and particularities matters of dust in the amount of dust in the air. Basically, we are being measured by the most, but also light phenomena, like light pollution, UV light, UV intensity and other phenomena that are being measured by a lot of people. And there are some, I would say, exotic phenomena, such as radioactivity. There are a few sensors for radioactivity on the OpenSense, and also the ones for the birds. These were the two examples I already made, but it's pretty broad and open.

Depending of the question, also the code of the Sensebox, we measure quite often, so we measure every minute, every phenomenon is measured every minute, but if anybody wants, for different reasons, measure in a different frequency, saying: maybe I have a environmental measurement station remotely somewhere, in the forest, and I don't have that much energy, so it works with battery or solar power. I can't measure this or that phenomenon every minute, so I measured every 10 minutes, you know? Or in other cases, much more often, and then I use, for example, averages to display the data. There are plenty of possibilities, it's very open.

And maybe as a last remark, the name you might have heard already of other open data projects with a similar name (these are our idols, basically), is OpenStreetMap. The whole concept of the OpenStreetMap is a world map made by people for the people, and is one of our idols, and maybe another crowdsourcing project, like Wikipedia, we see a lot of similarities here. People are creating a huge database for the people.

MS. VOIGT: This goes so much in an intersection between so different fields, but with the same spirit, or to mention _____ from this openness and collective intelligence that I think is so wonderful.

I'm going a little bit forward in our conversation. I would like to ask you both, and in your perspective, of course, if open data is into the reform agenda for global environmental governance. I would like to understand better if Germany and Brazil has… have… sorry… I'm going to say this again: if Germany and Brazil have a data policy that allows exchange between different institutes and/or universities? And if citizens can monitor governments on how they are managing the policies that can impact the climate?

I bring this from my experience in public procurement. We do have a lot of organizations who are monitoring how the government is expanding, not only in Brazil, but worldwide. I would like to know if it's the same thing with climate policies.

Whoever wants to start first.

DRA. PONCZEK: I don't know. Okay, just to follow the order, but I don't know.

This is not my field of research, I'm much more into hard scientist, as I like to say, but I guess, I think open data is, at least from the research perspective, it's part of our, let's say, modus operandi. There is a lot of open data available, mostly by regulatory agencies, universities, NGOs and other kinds of public administration bodies. There is a huge body of research and open data, that I'm sure, so I can even mention some projects that I know, that I've already been a consumer of data, for instance: in Brazil there is INPE, the National Institute for Spatial Research that has different platforms. They have data from satellites, they treat that data, they process them and they transform satellite data into available information for citizens, so anyone, in any part of the world, can enter in their website and in their platforms, for instance.

I know them, different ones, so there is one that is called Terrabrasilis, a INPE platform for deforestation, so they have data, they have graphs, deforestation maps, dashboards data you can download, and anyone can download that data, and treat, can make analysis, can… I don't know, play (I like to say I play with data). So, have downloading, and try to handle, try to process, try to extract useful information. Another institution that also has a wonderful work in public data is called MapBiomas and it's annual. MapBiomas stands for "Brazilian Annual Land Use and Land Cover Mapping Project", so they produce a diverse variety of maps for all biomes in Brazil, so they analyze how land use and lead cover is changing in Brazilian biomass, which is very important in the Brazilian context, because, particularity in Brazil, most of the greenhouse gasses emissions from Brazil comes from land use, so meaning deforestation and agriculture. So it's very important for Brazilian institutions - and also for the public government - to monitor how land use is changing in Brazil.

What else? I can also cite all the international initiatives, so satellites are also a very powerful tool for monitoring climate related data. As far as I know, NASA satellites have open data, they have open portals. Again, anyone, in all the world, can go to their websites, open the maps, open the data they have, they're very well treated and very easy to handle. It's available for everyone. Myself, in my research. I have used the fire alert data for instance, to monitor the day at the fire spots in the Amazon…

What else? Well, I can stay longer talking about all kinds of initiatives that are very fantastic, they're very accessible, that have very quality data, very transparent methodology, so they are very well documented so anyone can go to the website, read the methodology, read how they calculate each of the parameters they are showing to us.

Okay, Thomas, your turn.

DR. BARTOSCHEK: Yes, thanks a lot, Milena, I can go on and I can tell and congratulate you, or especially Brazil's open data policy.

You've mentioned INPE and we were working with INPE data already, a long time ago, and it's really great, it was already at that time. It's great to see how this can work. Brazil has really an outstanding open data policy already, for a long time, and I've even checked, right before the episode here, I checked on the websites of the Open Knowledge Foundation, that there is the government open data index and Brazil is amongst the top 10 countries all over the world, while Germany is around place 30, 25 - 30, something like that. So it's really a huge difference in how countries can work with that.

In Germany we then have another issue, which makes things a bit more complicated, which is the federal states here that have different regulations about the openness of data. Starting with maps and satellite pictures or aerial photography, which is really very important in the context of climate change projects and science about it. So, it was only a few years ago, at least in the State of North Rhine-Westphalia and here where we are situated, that this data was opened. I think 2017 was the year where the maps and area photography was available as "open data". Before that it was very difficult and expensive to work with that data, so, this made life much more complicated.

Another issue - in general here, not only for Germany - is probably data findability. Sometimes it is complicated and it takes time, where INPE and Brazil already had the time to prepare and to make a good accessibility to these data sets, with good explanations, as Milena said, on how to access this data, how to download and get the data sets. Maybe access them via interfaces, programming interfaces immediately where documentation is very important and this is a major challenge, because it's a lot of work to prepare that, it takes time from the point where a country or a governmental institution decides to open the data, it's not done yet, you know, you have to put a lot of work into that. This is one point.

The second point is also when the governmental data is online, then we go on, because it's presented very differently to different governmental institutions, and not only as it's online and marked as "open" that makes it good, and usable data, because you can imagine if you have some PDF documents marked as open data on the website of an institution. Well, it's still a lot of work to get it out, to do the Science with this data. If it's in PDF documents, you also need a machine to turn it into a readable format and this, again, might be some work and some time.

Another example for that, from Germany, maybe the German weather service. Now we are also close to climate topics. The German weather service, with a long history as a weather service itself, collected data for a long time already, they followed a law, a German law, I think in 2019,

where they needed… They were forced to open their data sets. So they did that, of course, they need to follow this law, but then the data is available on FTP servers. Yes, so you have a link “opendata.dvd.de” and then you are coming on an FTP server so no lay person, I would say, the citizens, they just need to click through some kind of folders, with cryptic names… It's not really understandable. And we know, I know from Geoinformatics it would be really easy to make this data available as a map, to offer diagrams, to offer visualizations of the data, immediately. It wouldn't be a problem, but well, they only followed the law, the things they must do, but not thinking that would make life easier and understandable for the citizens. This is a pity, I would like to say.

MS. VOIGT: I had a question for you, Thomas, but before that, I was reading the _____ that was published now, in july 2021, that imposes that research data should be also opened by default, and then my question, I thought at the same time about the _____.

I entered the website and I was quite surprised with the proposal of this agency, which is to measure with an interactive tool from many fields, as I can understand, many different fields… Umweltbundesamt, it means, in English, “environmental office”, federal office. So, I was quite impressed by that, but at the same time, when I entered the website I saw a lot of PDFs and I thought, “okay, maybe I'm not using this right”, because I also didn't know what to look at, to be honest, so I was just randomly seeing, to see how they were making their data and I was quite “okay, this is a lot of information, but it's not data”. I mean, someone can use it, of course, it is a good place to have everything in the same place, but I was quite confused, so I was going to ask you, if you want you use it a lot, if I look at the wrong place, or what do you think about this strategy?

I mean, we didn't talk about this earlier, but I'm curious now that we're talking about it.

DR. BARTOSCHEK: Yeah, it depends. I'm not exactly sure which kind, because Umweltbundesamt, this is the German Environmental Agency, I would call it, has of course a lot of data sets, and a lot of topics they care about, and really broad topics, so I'm not sure where, but I’m pretty sure that you found a lot of PDFs because this is how it starts.

I believe, as you said, plenty of these laws in Germany are new and I’ve mentioned open data for weather service in 2019, North Honduras files for the maps and area photography 2017, so we are speaking of a few years, and it starts with these steps. And Germany is on the way. Late and a bit slower, maybe, so I believe it's a start.

I can go back even some years and make a small example from Münster, from the city of Münster, where we started an open data initiative within the city, coming from Science, from University. We got in touch with someone with the city government and the people from some kind of an office for green spaces in the city, and we asked them to open the data and they were: “Oh no. Maybe the city can make some money and sometimes we can't open… Okay we will do it.” So what they did is they just put two Excel files on their website about the places of playgrounds and sports places in the city, or something like that, which was not very valuable, but it was a first step and this was, I think, more or less 10 years ago, and now, already since two years, the city of Münster has an officer, an open data officer, a person with a full position only working for the city, to make data from the city openly available, and accessible, and findable. It was a way from reverse data sets, to now having a person having an open data portal for the city. A long way, 10 years. Maybe the Umweltbundesamt is on this way, but not yet there.

MS. VOIGT: Yeah, I know, of course. It is much more difficult to make this work all together. but I'm really glad that you mentioned the city of Münster.
I participate in the Hackathon and they allow us to see. They sent to us a lot of databases and I was impressed by how many environmental databases are found there. I think two things we can say about what we’ve said so far is that: maybe governments have to learn from examples like INPE, or other agencies that Milena mentioned, of how we can actually make data available, and also that we are going in some direction. We are mixing these two worlds, of citizens… or better saying, a broader access of this data for citizens that are not experts,
and now I would like to come back to something that Milena said about capacity building, because we’ve talked a lot about INPE, and she mentioned satellite data and I actually work already with Sentinel. “Work”... I mean, I did a workshop, it was quite fun. I’ve learned a lot, I coded and I saw the images and they said “you can make a little project of that, just to use the code, just to practice”. And I said “okay, what can I do with that? I have no idea, I'm a political scientist”. Then I made a map of Brumadinho, the area of Brumadinho which had a natural… I'm sorry, it was not a natural disaster, it was an environmental disaster, caused by a mining company some years ago. So I took the satellite images from before and after to see the spread of the mud that came from this disaster, but then I was thinking now, when I was listening to you both, that: how can we actually make local citizens, who are sometimes not PhD students in atmospheric or special or PhD students in general informatics, how can we make them work

with data once this data is available, once there is this opportunity? How would you share this experience about creating capacity building?

DRA. PONCZEK: Okay, for sure training, having people trained to have programming skills it's a very important part of the open data policy because, for sure, as you mentioned, it's not that easy for our lay people to just jump into our website or, let's say, NASA or even INPE and download a database. It's not that intuitive, so you need some background before starting dealing with this data, and I would say that satellite data it's in the key data, because they are very powerful.

Again, you can, satellites can measure almost all kinds of environmental parameters we can imagine, but they are not easy, they're not ready, understandable, for lay people. I think they stay much more in the research field community, than for a regular public, but one thing that I was thinking about during the discussion is that sometimes the raw data, let's say, even if it's not raw, but data in a data set, it's hard to understand for lay people ,and for people that doesn't have a programming background. I'm a pretty good fan of reports, so I think a report is a very useful framework that gives transparency to organizations and to the public sector. Sometimes we can't, that's the thing, I can understand atmospheric data, atmospheric information, but I can’t understand, let's say, procurement information, so for me, as a lay person in this field, I’d love to read reports. I think it's important to the public administration to produce a nice, beautiful, readable, and complete report from these parameters that are being measured, and needs to approach civil society. What is your opinion about that?

DR. BARTOSCHEK: I can maybe add to the question, to Jessica's question?

On top of the reports and going a step back, also you mentioned programming skills, which I find really interesting and impressive and really important to have for that, but we can go even one step further and, as I’ve mentioned in the beginning, I started this journey here also in the Educational sectors, or in schools even, not even higher education, but in secondary, sometimes even primary education, and there maybe even before programming skills the general data skills or how we call it “data literacy” is something we need to focus on much more, already in school times, amongst the youngest. Of course we all would need it and we know now that there are jobs like data scientists and whatever, so there will be more people working on that, but we need to start earlier to teach data and literacy and to have it as a basic skill amongst the general skills of reading, writing and so on.

We do that with the Sensebox. On one side, we do that also in other projects, recently we had a project called _____, we are still working on that, and it's the climate data school, basically, where schools participate and the high school students, 12 year olds, more or less, learn to collect data in different fields that are related to climate change and it doesn't have to be direct climate data, like temperature data or whatever, but this indirect data may be much closer to what Milena said before: data that helps us to understand how to release less greenhouse gasses, to change the acting of the people… So, it might be data about the food and the canteens of the schools. There is no data about that, but the high school students might start to collect this data, open this data and work with that data. And working with data means, then, if they collected this data, they need to be able to access it, to download it and then, maybe, start really with the simple things, in a spreadsheet Excel or whatever kind of system, just to work with basic statistical things that are possible in that time, in those ages and then, go on and maybe come to the next step, which would be the programming skills.
If you have a lot of data, you would even need more, maybe scripting skills, and use some tools like Python or whatever to dig into the data and find things that are not visible on the first look, basically.
This is interesting, especially this extra data, this indirect data related to climate change, it is something where there is a lot of potential concerning data literacy.

MS. VOIGT: I'm thinking… I made this question because I was thinking more about how can we make local interventions since we have the data, because that is a problem, governments have a lot of power, they do have a lot of money, they do have a lot of agency, but they, as we say, in the political science field, they are like elephants, they move really slowly, because they are heavy and we cannot expect everything to be done by governments.
And I'm thinking about local interventions that could be made using this data. So that was also a little bit the spirit of this question, it was a bit: "Can we use data, somehow, if I'm not a specialist, in a way that I can make local interventions?"
Maybe what Thomas mentioned, to emit less greenhouse gasses would be a way, or to make a building more efficient. I don't know, I'm kind of thinking out loud here, brainstorming here, but I like to think that… I don't want to remove the responsibility of government, because we do know that most of the polluted gasses and most of the problems have to do with strategic national policies, but also we could increase, or improve… (sorry) We could improve our local environment and I think small interventions that allow birds to come back or trees to grow… I

don't know if i'm being naive by saying that, but I have this… this faith that most of the changes have to be local base change.
But anyway, keep going.

DRA. PONCZEK: But of course, climate change is such a complex issue that all kind of levels must be involved: there is the strategic and diplomatic sphere, that create policies and big strategies, big policies, global policies, national policies, that must exist, but also I believe that we, as citizens and as regular people, also have some kind of power, or even if as individuals, as a community, as a group of people that wants to do something right.
I think, again, another concept, another interesting term is what Thomas, actually, the work of Thomas is part of what we call “citizen sciences” that it's like putting people, citizens to produce science, to produce data and it doesn't have to be, again as Thomas also have said, it doesn't have to be a very fancy kind of data, or very fancy sensors. Sometimes people can just monitor, for instance, the level of water in the reservoir. It doesn't require any kind of sensors, it's just “go there and check”, or another example that I can think about: monitor the color of the sky: “How is my impression of the sky today?” Like, day 1, the sky was pretty blue, it was pretty cloudy, or I saw some pollution or some particles in the air…
There is a variety of same sensitive information that people can start being familiar with, and that approach to the idea of monitoring, of having data management…
I don't know.
The odors, as well, like you can put people too, if you have a community, for instance, that live close to a factory or to a big power plant or whatever, they can simply monitor the odors of the air. It’s something very simple and makes this kind of proximity between individuals, and having the same sense of data science, as we call it in a fancy way, right?

DR. BARTOSCHEK: May I just come here, jump in and go on?
So, with the local intervention, these are great, great examples for citizen science projects, and we see the Sensebox and OpenSense, as a citizen science project initiative and maybe, as you said, this need for these local interventions in cities. I see the same and I believe that the citizens want the change, they want a complete change, the majority of the people, at least, and as you said, the cities, the governments, are pretty slow and have heavy ships to move and sometimes they don't want to react immediately if some citizens come around.
I like a quote I found here and there on twitter, and so: “People without data have an opinion” and that's how cities may take the citizens, saying: “Ah, you have to change this and that

because of that… this is an opinion", but people with data have evidence. So, if people are facilitated to collect the data and even to prove that it's good data, then they'll have evidence and can even foster this change of a city government.

I would like to make a very recent example of a project we do right now with Sensebox in Berlin, which is a kind of intervention: When we think of reducing CO_2 emissions, one good thing to do is changing from cars to bikes, basically, and this is, and we can agree I think on that, this would be a really great intervention all over the world, to do so if possible. But we know about large cities having usually, not all but usually, not good conditions for biking, in terms… in a lot of terms: air quality, cars dangers and so on and so on. So what we are doing right now in Berlin: a group of citizens, 30 citizens, are equipped with mobile Senseboxes. They are attached to their bikes, they build them themselves in a workshop with us and they are collecting environmental data while riding, so on air quality, for example, temperature as well, but also data that, on the first look is not related to climate change, on the second it is, so it they are collecting data about the distance to the cars: "how close are the cars coming?" And about how bumpy the road is, about the quality of the road, basically, and they collect this data while riding for a few weeks.

This data has been collected and available as open data, on OpenSense Map and then, this group of people can take this data and bring it to the local government and we had in the workshop a person from the district of Berlin that said she is the person responsible for bike lanes. "I can't decide which bike line to do first, so I need data, but the city of Berlin does not have the capabilities to collect this data." Now these two worlds meet, someone in the city being slow, because there is no data, meets the civic enthusiasts spiking into this, they are collecting data, and now, we hope this can change things in the city.

MS. VOIGT: I didn't know about this project, I really want to know about this more.

Eric Kill mentioned in a comment that I'm going to bring it here: "Hi, at FMUSP (I think is the Faculdade de Medicina, if I'm not wrong, please correct me) we have developed a low-cost equipment that we have calibrated and we are using it to monitor cyclists. Congratulations on the SenseBox initiative, Thomas."

So this is a fan!

DR. BARTOSCHEK: Yes, I know Eric! Thanks a lot, Eric. I know about his initiative, we are more or less in touch. I have to respond to a message so… hi to Eric!

MS. VOIGT: And I have a last question, our time is going and I'm actually pushing a little bit further, I hope you don't get upset with me by doing that.
But we have a last question: So we have both goals for 2030 and 2050. Regarding this, I would like to get your perspective: Is there any data that we are not collecting and we should collect?

DR. BARTOSCHEK: So maybe just to change the order, I hope it's okay, Milena.
So, I think the last example I made with the bikes is a start. So this data, there is no data like that around, and we need to do that. There are also no aims to collect this kind of data from governmental science, as far as I know. So this is one example of this somewhat indirect linked data to climate change.
I think this is one example, there might be more data on trees for example, knowing where and how many trees are around, because we always speak about some kind of mass, and this is the other way around, where CO2 can get encapsulated, basically. I recently read a paper of a colleague of mine that used AI methods to count trees in the Sahara and they had an impressive number of, I don't remember, two billion trees in the Sahara, where one would think there are no trees. And it's based on satellite data, of course, and image recognition and so on. This was new to me completely, new that there are so many trees in the Sahara. And also this data is new, and then we need more of this kind of data that is indirectly related to topics, like biking or trees. And for sure more, when I spoke about canteens, food and here we come again back to Brazil.
Maybe Milena you can continue in that direction, when we think about food production, land use - that has a strong impact on climate change, then again - and here we think about deforestation that is being done in Brazil due to how food is needed and how the food consumption also in Europe works, you know? If we could eat less meat, this would have a strong impact on climate change. This would be one example where a lot of data indirectly is involved in these questions. Or should be.

DRA. PONCZEK: Yes, for sure. We can cover it, with more and more data related to climate change, directly and indirectly speaking.
One thing that comes to mind, like just came to my mind it's the need for more regulation, so for instance, by now in Brazil, companies are not… it's not mandatory for companies to make greenhouse gasses inventories, for instance. It's still voluntary, so companies are starting to do that because of international pressure, because of this whole international discussion about the greenhouse gas emissions, but it's not mandatory, so maybe having more regulations, public

regulations and law about greenhouse gas emissions would increase awareness, would increase the collection of data, would increase the management of these emissions in the federal perspective. And this is not just for greenhouse gas emissions, not for atmospheric conditions.

In Brazil, for instance, - and this is what I work with, with air quality - we have very little monitoring. Not all state agencies have the capacity of measuring air quality parameters. For instance, I know that in the State of São Paulo there has been that, it's the Environmental Agency of the State of São Paulo. They have a very good infrastructure for measuring all kinds of air pollutants. The data is available, it's open, they have very good reports, but it's not the reality for all states in Brazil. For instance, in the Amazon state they probably don't have this degree of often control in air pollutants, and it's a region that it's in the core of the discussion, so they need to improve their infrastructure, their capacity to measure and to monitor air quality: that it's a way of knowing if biomass burning is occurring, if deforestation is happening all around them.

But just to mention some examples.

MS. VOIGT: Well, our time is up and our extra time is up. So I would like to thank you, Milena Ponchak and Thomas Bartosheko for being with us today.

DR. BARTOSCHEK: Yes it was a pleasure. Thanks a lot for the invitation and thanks Milena for the great talk and the insights into your work.

DRA. PONCZEK: Thank you too, Jessica and Thomas, it was very insightful. I've learned a lot. It's wonderful to have people from different backgrounds discussing a common subject. I appreciate it all.

MS. VOIGT: And finally, I would like to thank you who is watching us today, for taking your time to be part of this discussion.

Data Talks is a series of talks between experts from Brazil and Germany, who discuss the use of public data in today's society. The Data Talks is an initiative from myself, Jessica Voigt, as part of the German Chancellor Fellowship,from the Alexander von Humboldt Foundation and is hosted and supported by the Brazil Center of the University of Münster, in the framework of the strategic partnership project wwusp, funded by the DAAD.

I will see you in the next talk. Have a nice weekend.

TIME FORMAT

0:00:16.720,0:00:24.240
Hello, welcome to Data Talks. Today I would like to
apologize for our technical issues, we are a little

0:00:24.240,0:00:32.720
bit late, but still we're going to have a great
talk today. It is not as if we're not warned about it,

0:00:32.720,0:00:39.600
the temperature of the planet is increasing and
this will bring harmful consequences for societies

0:00:39.600,0:00:45.680
all over the world. Throughout History humans
have built cities according to natural resources

0:00:45.680,0:00:53.200
and availability of good conditions,
such as water and temperature for food production.

0:00:53.200,0:01:01.040
With the increase of the Earth temperature, all of this
is about to change. Natural phenomena, such as

0:01:01.040,0:01:07.680
the rains in Germany and the dry in Brazil, both
of which happened this year, will be more often

0:01:07.680,0:01:15.920
and less predictable. We might be talking here
about human extinction. Since 1992 governments all

0:01:15.920,0:01:21.520
over the world are developing climate governance
in which agreements and goals are settled to avoid

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drastic increase of the planet's temperature.
Meanwhile civil society movements, such as

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Fridays for Future, claim that national governments
are not making enough. Data was always an asset for

0:01:35.200,0:01:42.320
Science and now governments and citizens need
to learn the language of Science. How can public

0:01:42.320,0:01:47.680
data help local and national governments to
create strategies to fight the climate crisis?

0:01:48.240,0:01:56.560
And can the civil society herself produce and use
this data today? We have two very special guests to

0:01:56.560,0:02:04.560
talk about this with us. From Brazil, we have today
Milena Ponczek. Milena is an atmospheric scientist

0:02:04.560,0:02:12.720
working on the interaction of volatile organic
compounds with atmospheric aerosols, air quality

0:02:12.720,0:02:18.400
and climate. She holds a degree in Chemical

Engineering from the State University of Campinas

0:02:18.400,0:02:26.240
in Brazil, a PhD in Chemistry at the University of
Lyon, France. She is also a former postdoctoral

0:02:26.240,0:02:32.160
researcher at the Laboratory of Atmospheric
Physics at the University of São Paulo where

0:02:32.160,0:02:40.000
her work was focused on better characterizing
aerosol life cycles in the Amazon region

0:02:41.600,0:02:47.120
and understanding the impacts of
deforestation and biomass burning on

0:02:47.120,0:02:55.040
the atmosphere. Beyond the context of her technical work,
she is interested in socio-environmental

0:02:55.040,0:03:02.960
issues and how to create bridges and interaction
between so-called “hard” sciences, and social and economic

0:03:02.960,0:03:09.120
sciences, in order to make scientific and
technological advances approach society.

0:03:09.120,0:03:15.920
She is one of the producers of the Atmospheric
Tales podcast that covers themes related to air

0:03:15.920,0:03:20.960
pollution and climate change. Milena, thank
you very much for being with us today.

0:03:22.000,0:03:27.680
DRA. PONCZEK: Hello, hi Jessica, hi Thomas and everyone.
It's a pleasure to be here today with you.

0:03:30.640,0:03:39.040
MS. VOIGT: And from Germany we have today Dr. Thomas Bartoschek.
I'm going to say this again: Dr. Thomas Bartoschek.

0:03:39.600,0:03:45.360
Thomas is a postdoctoral researcher at the
Institute for Geoinformatics, University of

0:03:45.360,0:03:54.480
Münster and Co-Founder and CEO of the edtech
Start-up re:edu since 2018 and of the non-profit

0:03:54.480,0:04:02.080
openSenseLab since 2021. Thomas holds
a PhD in Geoinformatics he received

0:04:02.080,0:04:08.960
from IfGi, in 2017. His research interests
are in Geotechnologies for spatial learning,

0:04:08.960,0:04:15.280
human - computer interaction, Citizen Science,
Digital Education and Daily Literacy.

0:04:15.920,0:04:22.080
During his career, he investigated and developed

various technologies for Citizen Science and

0:04:22.080,0:04:29.680
digital learning with Sensebox and OpenSense Maps being the most prominent.

0:04:29.680,0:04:36.080
He has experience in leading various research projects on a national
level, and received several awards for his work,

0:04:36.080,0:04:44.480
most relevant is the ACM Eugene L. Lawler Award for
Humanitarian Contributions within Computer Science and Informatics, in 2013.

0:04:47.690,0:04:51.440
Thomas, thank you very
much for being with us today.

0:04:51.934,0:04:57.280
DR. BARTOSCHEK: Thanks a lot, Jessica, for the invitation. Hello, Milena. I'm really happy to be here, looking forward to the talk.

0:04:59.760,0:05:04.160
MS. VOIGT: So, this is one of those talks that I
hope I'm not going to talk too much.

0:05:05.280,0:05:12.320
I’m going to post a really simple
question, first to Milena. Could you

0:05:12.320,0:05:16.640
explain to us what are the general
strategies to fight climate change?

0:05:18.480,0:05:26.560
DRA. PONCZEK: Hello again. So, Jessica, you first made

an excellent introduction to the topic,

0:05:26.560,0:05:36.320
so, moving forward. First, giving
some, let's say ‘basic concepts” related to

0:05:37.520,0:05:44.320
strategies to fight climate change:
we know it's a systematic and global vision

0:05:44.320,0:05:50.320
that challenges, that affects all layers
of any spheres of our society, globally,

0:05:51.120,0:05:57.200
and of course, such a big
challenge doesn't have a

0:05:58.640,0:06:08.080
simple solution. Currently, some of the
strategies and concepts related to tackling

0:06:08.080,0:06:16.320
climate change, I would say, are mitigation.
Talking about mitigation I'd like to precisely

0:06:16.320,0:06:24.480
describe what is a mitigation: the
definition of the IPCC - which is a

0:06:25.920,0:06:33.600
theoretical guide for climate change
issues. So, basically, mitigation is any kind of

0:06:33.600,0:06:42.640
intervention to reduce the sources or enhance
the sinks of greenhouse gasses. So, it's basically

0:06:42.640,0:06:53.840
trying to avoid releasing greenhouse gasses
to the atmosphere and, meanwhile, we have to

0:06:53.840,0:07:00.160
invest in mitigation policies. We also
have to invest in adaptation, that it's

0:07:00.160,0:07:09.440
a different concept. “Adaptation” is the process
to adjust to the actual climate or to adjust

0:07:11.440,0:07:17.280
to future effects in climate changes:

0:07:18.640,0:07:25.120
temperature rising and all kinds of
effects that climate change will bring to our

0:07:25.120,0:07:33.120
society, so cities and natural systems as well.
I think another concept that is pretty

0:07:33.120,0:07:39.840
important nowadays is the concept of
resilience, that it's pretty much in the

0:07:39.840,0:07:51.200
debate right now. “Resilience” is the capacity
of all kinds of systems and, let's say, the social,

0:07:51.200,0:07:57.840
economic and environmental systems to
handle hazardous and extreme events.

0:07:59.040,0:08:08.960
So, responding well to those extreme events,
that climate change is

0:08:10.320,0:08:17.680
putting us to face and maintaining so,
constructing a way of tackling and to

0:08:17.680,0:08:25.840
support, and to handle all these
extreme events of climate change.

0:08:27.040,0:08:34.960
So, moving forward some
strategies, to put them into practice

0:08:34.960,0:08:41.120
it's very important to know from where
the greenhouse emissions are coming from.

0:08:41.760,0:08:46.720
We can't think about how to
solve a problem if you don't measure,

0:08:46.720,0:08:55.440
if we don't quantify and monitor the
sources and sinks of greenhouse gasses.

0:08:57.280,0:09:07.600

It's extremely important that all sectors
and activities that release greenhouse

0:09:07.600,0:09:15.760
gasses, they monitor, quantified and invest in
measuring, in doing what we call “emission

0:09:15.760,0:09:25.520
inventories” to know exactly what kind of process,
what kind of activities are meeting mostly of

0:09:25.520,0:09:32.400
greenhouse gasses and other kind of pollutants
as well, because of course climate change is

0:09:32.400,0:09:39.440
pretty related to the greenhouse gas emissions,
but if you think in a more holistic approach,

0:09:40.160,0:09:47.440
we can also tackle other environmental
issues, such as air pollution, or water pollution

0:09:48.000,0:09:59.120
or also the loss in biodiversity…
All kinds of issues are related,

0:09:59.120,0:10:05.520
and have also common solutions:
common problems and common solutions.

0:10:04.937,0:10:07.908
What else?

0:10:08.560,0:10:15.520

MS. VOIGT: Yeah, it's quite
interesting that I've never heard about… I'm not

0:10:15.520,0:10:23.600
from the field, so I'm putting myself in this
debate as a normal citizen who reads the newspaper,

0:10:24.160,0:10:30.320
the Brazilian ones… So, not so
long ago and the words "mitigation", "adaptation"

0:10:30.320,0:10:39.280
and "resilience" are quite new for me. I heard
them recently, during the Cop26 discussions.

0:10:39.280,0:10:44.240
And I think when you talk about the holistic
approach, we're talking also about, for example,

0:10:44.240,0:10:53.040
the decision of reducing the emission of
methane, instead of only CO_2, because the methane

0:10:53.040,0:11:00.240
would also be harmful, but it's easier to
recover its impact once it is not released anymore.

0:11:00.240,0:11:07.600
Am I saying this right, or am I saying something wrong?
DRA. PONCZEK: Yeah, so methane is one of the greenhouse gasses.

0:11:07.600,0:11:16.160
What is the main difference between CO_2, carbon dioxide and methane?

0:11:16.160,0:11:25.440
So, methane is what we call short-lived species,
so it's a gas that has a much shorter lifetime

0:11:25.440,0:11:32.800
in the atmosphere, because CO_2 has a very long
lifetime, around 100 years and methane

0:11:32.800,0:11:40.320
has a much shorter lifetime. In this
way, since we decrease the emissions,

0:11:41.680,0:11:50.800
the impacts and the effects of reducing
these emissions are also few.

0:11:52.320,0:12:13.680
So, the positive impacts of reducing its emission are much easier and faster to observe.

0:12:13.680,0:12:20.640
Another interesting information
is that CO_2 is our main

0:12:20.640,0:12:27.200
greenhouse gas, because it's the most
abundant one and also because of its very

0:12:28.160,0:12:34.480
long lifetime, but there are many other
greenhouse gasses, such as methane that was in the

0:12:34.480,0:12:42.560
discussion of Cop 26. There are also neutral oxides
and also the CFCs, that are a known problem, because

0:12:42.560,0:12:51.840
they are also Ozone depletion species that
are, at the same time, also greenhouse gasses.

0:12:53.840,0:13:00.720
MS. VOIGT: Thank you for this explanation. I think we're
going to come back to it, i feel, a bit later.

0:13:00.720,0:13:07.840
I would also like to invite Thomas to this
round and ask him about your experience

0:13:07.840,0:13:17.280
with Sensebox and OpenSense Maps. You produce
data from civil society, also to help inform

0:13:17.280,0:13:23.440
civil society and maybe other actors. I would
like to learn about what you're doing and

0:13:23.440,0:13:26.383
if you could explain this more to our audience.

0:13:26.383,0:13:28.383
DR. BARTOSCHEK: Yes, I'm glad to do that, Jessica, thanks a lot.

0:13:30.800,0:13:35.760
So, first of all I'm really happy
that Milena is with us as an expert,

0:13:35.760,0:13:41.680
and I really couldn't put it in words as I’m
also not from the field I'm from Geoinformatics, so

0:13:41.680,0:13:47.120
usually I start there, where the data comes
in here. I'm not from Atmospheric

0:13:47.120,0:13:51.760
Sciences or Climatology in general, so I'm really
happy, thanks Milena for this great introduction.

0:13:53.760,0:13:59.600
And Jessica, as you said, we have a project here,
at the University of Münster, that we've started and in

0:13:59.600,0:14:06.400
our Startup now, the Sensebox, as you mentioned,
which is a device we have designed and developed

0:14:06.400,0:14:13.600
here in our Institute for Geoinformatics.
First ideas started 10 years ago,

0:14:13.600,0:14:20.160
more or less, where we worked with high school
students in small projects to, basically,

0:14:20.160,0:14:26.720
teach them to code and to work with sensors
and with environmental data.

0:14:26.720,0:14:32.320
This was the first aim here and we started to do that with
different approaches and came across possibilities

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to let them work with a microcontroller.
A small device connects sensors and lets them code

0:14:39.040,0:14:44.640
this microcontroller to learn how to program, basically.
And then, they tested their devices: they went out of the

0:14:44.640,0:14:50.400
building and measured data. The first thing
they liked to measure was temperature data. Yes,

0:14:51.680,0:14:58.400
air temperature and humidity, so already
some ideas of phenomena that are

0:14:58.400,0:15:04.800
of course closely related to
climate change. And by doing that

0:15:05.680,0:15:10.880
we found out that it's pretty motivational:
to have this hands-on activity building a device,

0:15:11.440,0:15:16.000
programming it and then having some data with
it… We said “okay, when the data is appearing,

0:15:16.000,0:15:21.760
data is coming in, it would be interesting
also to keep the data and to make it available openly

0:15:21.760,0:15:28.640
So we started immediately to
develop a platform called OpenSense Map where

0:15:29.520,0:15:34.480
the data was going to, basically, this
device. So, at first, we had to make these devices

0:15:37.760,0:15:43.840
able to connect to the internet and send the data
to this platform. This was the idea, some

0:15:43.840,0:15:49.360
kind of an ecosystem that was born with that
time, with a toolkit, a “do-it-yourself” toolkit,

0:15:49.360,0:15:54.880
where kids, but also citizens, can build their
own measurement device. After posing their own

0:15:54.880,0:16:01.280
question about the environment, they are
able to code, to program this device

0:16:01.280,0:16:05.600
depending on the question, depending, maybe, on
the intervals of how often they want to measure, or

0:16:05.600,0:16:10.160
what they want to measure, in general. Then,
having the possibility to really publish the

0:16:10.160,0:16:15.680
data they are gathering and make it openly
available for everyone. So, it was somewhat the

0:16:15.680,0:16:22.560

whole scientific process that is necessary here,
putting into a nutshell basically, from the question to

0:16:22.560,0:16:27.840
designing a device collecting the data,
programming the device, collecting the data

0:16:27.840,0:16:35.120
and publishing the data, to be able to, maybe, answer
the question. And the questions, maybe, just to

0:16:35.120,0:16:41.120
close here, the questions can be very, very broad,
yeah, it can be a general question, collecting just

0:16:41.760,0:16:48.480
continuously temperature data which
now, I said, we started nearly 10 years ago,

0:16:48.480,0:16:53.440
so it's a short term in the
climate change topic, but still

0:16:53.440,0:16:58.960
it is possible we see that the years, every year, are
getting warmer, so we already can see these things

0:16:58.960,0:17:05.600
already from the data here. This was basically
the starting point for Sensebox and OpenSense Maps.

0:17:06.720,0:17:15.840
DRA. PONCZEK: If I may add something, just a comment.
First, congrats for the project,

0:17:15.840,0:17:22.000
it's very interesting, it's very important because…
so, taking the lead of the first question Jessica

0:17:22.000,0:17:29.200
asked me, I forgot to mention a very important strategy for

0:17:29.200,0:17:35.760
fighting climate change, that is “capacity building”.
It's, again, another term that is pretty

0:17:35.760,0:17:45.840
much in the debate, which means, basically,
training, informing, having people trained to

0:17:47.040,0:17:58.240
tackle their problems and one of the first
steps for having people to feel and

0:17:58.240,0:18:08.080
to be into action is to have their
information and once you

0:18:08.080,0:18:17.920
are acquiring data, acquiring your own information,
you can approach people and kids and,

0:18:17.920,0:18:27.840
let's say, civil society to the problem. So I
think it's wonderful to have this kind of project.

0:18:29.200,0:18:36.720
MS. VOIGT: My data also… When we were researching

about this episode, I need to say that

0:18:36.720,0:18:43.200
I fell in love with this idea, because I'm from the
transparency field of the public procurement, mostly,

0:18:43.200,0:18:46.480
so we talk about how money is
spent and there is

0:18:47.200,0:18:53.600
this big difference in the environment, in
the environment of civil hacker in Brazil and

0:18:53.600,0:19:00.160
Germany. In Brazil there is a lot of
interest in public procurement, public

0:19:00.160,0:19:05.360
spending, because we have our problems,
and here in Germany I saw in Hackathons,

0:19:05.360,0:19:13.440
in open knowledge labs and other parts where I
had contact with society hackers.

0:19:15.760,0:19:24.320
The main focus here is in climate
change and in the climate crisis and how to measure, how to

0:19:24.320,0:19:31.200
avoid or how to bring something new that, maybe,
the public policy is not being able to develop.

0:19:31.200,0:19:38.640
So, the OpenSense Map puts all of this
information, and all of this data,

0:19:38.640,0:19:44.080
because data is not only about information, there
is a way that we can measure, we can compare,

0:19:44.080,0:19:48.640
we can cross. So I thought it was sensational.
And I have two more questions about the

0:19:48.640,0:19:55.360
the SenseBox that I didn't hear
and I would love to hear: I saw that

0:19:55.360,0:20:02.240
you have the “boxes” all over the world, I'm
really curious to know how you could

0:20:02.240,0:20:09.600
spread so much, because I saw they are in all
continents and this is quite amazing.

0:20:10.320,0:20:18.640
And if I understood it right, every single person
who acquires, or an organization, or group who

0:20:18.640,0:20:27.360
acquires the boxes, he or she can set up
what is going to be measured. Or all of them

0:20:27.360,0:20:31.120
are now measuring the same things?

Could you explain this a little bit better?

0:20:32.000,0:20:38.720
DR. BARTOSCHEK: Of course, of course I will. So, the SenseBox e o OpenSense Map are, in fact,

0:20:39.440,0:20:46.560
two things that interact very well with each other, but
they can both be seen completely individually,

0:20:46.560,0:20:51.600
so maybe I will start with the OpenSense Map
as one platform and the name says it already:

0:20:51.600,0:20:57.520
it's open. Open in terms of the data which
is available there, it is open data, which was

0:20:57.520,0:21:05.280
our main intention here. But also it's “open”
for the device that connects to the platform,

0:21:05.280,0:21:11.200
and sends data to and “open” to all kinds of
phenomena. So it's about environmental phenomena.

0:21:11.200,0:21:17.600
And it may be temperature, but it also may be
radioactivity, or it may be pictures of

0:21:17.600,0:21:23.840
the number of birds that come into your garden,
if you have a sensor, a camera, that would measure that.

0:21:23.840,0:21:29.840
You could. You can and people do that, they
use the OpenSense Map and it's open

0:21:29.840,0:21:35.760
for the devices. So we started it. First we connected
our SenseBox to OpenSense, so

0:21:35.760,0:21:41.200
they communicate with it, but then people,
civil hackers, as you mentioned Jessica, started

0:21:41.200,0:21:45.680
to recognize the platform and use their own
devices, and connect them to the platform.

0:21:45.680,0:21:52.800
So, the devices connected are not only SenseBoxes, but there are
other devices as well. So this is also the case,

0:21:52.800,0:21:58.880
that a lot of the devices registered on OpenSense Maps come also from different projects, or

0:21:58.880,0:22:04.480
just do-it yourself devices from civil hackers, or
citizen scientists that just want to contribute.

0:22:05.120,0:22:12.080
And as OpenSense is also open to all kinds of
phenomena, either Sensebox or other devices

0:22:12.080,0:22:16.720
can be configured depending on the question you
have. We have with Sensebox some kind

0:22:16.720,0:22:26.400
of a standard set of sensors saying temperature,
humidity and particularities matters of dust in the

0:22:26.400,0:22:33.120
amount of dust in the air. Basically, we are being
measured by the most, but also light phenomena, like

0:22:34.160,0:22:40.480
light pollution, UV light, UV intensity and other
phenomena that are being measured by a lot of people.

0:22:41.120,0:22:45.920
And there are some, I would say, exotic phenomena, such as radioactivity. There are a few sensors

0:22:45.920,0:22:50.480
for radioactivity on the OpenSense, and also the
ones for the birds. These were the two examples

0:22:50.480,0:22:57.040
I already made, but it's pretty broad and
open. Depending of the question, also the

0:22:57.040,0:23:04.000
code of the Sensebox, we measure quite often, so
we measure every minute, every phenomenon is

0:23:04.000,0:23:09.040
measured every minute, but if anybody wants,
for different reasons, measure in

0:23:09.040,0:23:15.680

a different frequency, saying: maybe I have a environmental measurement station remotely

0:23:15.680,0:23:20.960
somewhere, in the forest, and I don't have that
much energy, so it works with battery or solar power.

0:23:20.960,0:23:27.120
I can't measure this or that phenomenon every
minute, so I measured every 10 minutes, you know?

0:23:27.120,0:23:34.800
Or in other cases, much more often, and then I use,
for example, averages to display the data.

0:23:34.800,0:23:40.400
There are plenty of possibilities, it's very open. And maybe as a last remark, the name

0:23:40.400,0:23:45.280
you might have heard already of other open data
projects with a similar name (these are our

0:23:45.280,0:23:51.600
idols, basically), is OpenStreetMap. The whole
concept of the OpenStreetMap is a world map made by

0:23:51.600,0:23:57.280
people for the people, and is one of our idols,
and maybe another crowdsourcing project, like

0:23:57.280,0:24:03.840
Wikipedia, we see a lot of similarities here.
People are creating a huge database for the people.

0:24:04.880,0:24:12.320

MS. VOIGT: This goes so much in an intersection between
so different fields, but with the same spirit,

0:24:12.320,0:24:20.080
or to mention _____ from this openness
and collective intelligence that

0:24:20.080,0:24:27.600
I think is so wonderful. I'm going a little
bit forward in our conversation. I would like

0:24:27.600,0:24:36.000
to ask you both, and in your perspective, of
course, if open data is into the reform agenda for

0:24:36.000,0:24:42.560
global environmental governance.
I would like to understand better if Germany and

0:24:42.560,0:24:49.840
Brazil has… have… sorry…
I'm going to say this again: if Germany and Brazil have a data

0:24:49.840,0:24:59.360
policy that allows exchange between different
institutes and/or universities?

0:24:59.360,0:25:05.840
And if citizens can monitor governments on how they are
managing the policies that can impact the climate?

0:25:06.880,0:25:13.680
I bring this from my experience in public
procurement. We do have a lot of organizations

0:25:13.680,0:25:18.720
who are monitoring how the government is
expanding, not only in Brazil, but worldwide.

0:25:18.720,0:25:27.840
I would like to know if it's the same thing with climate policies.
Whoever wants to start first.

0:25:30.320,0:25:36.800
DRA. PONCZEK: I don't know. Okay, just to follow
the order, but I don't know.

0:25:37.360,0:25:49.680
This is not my field of research, I'm much more into hard scientist,
as I like to say,

0:25:49.680,0:26:00.160
but I guess, I think open data is, at least from the research perspective,

0:26:00.160,0:26:09.840
it's part of our, let's say, modus operandi.
There is a lot of open data available,

0:26:12.320,0:26:21.440
mostly by regulatory agencies, universities, NGOs
and other kinds of public administration bodies.

0:26:23.520,0:26:31.840
There is a huge body of research and open
data, that I'm sure, so I can

0:26:31.840,0:26:38.000
even mention some projects

that I know, that I've already been a

0:26:38.880,0:26:48.320
consumer of data, for instance: in Brazil there
is INPE, the National Institute for Spatial Research

0:26:48.320,0:26:58.480
that has different platforms. They have data

0:26:58.480,0:27:04.960
from satellites, they treat that data, they
process them and they transform satellite data into

0:27:04.960,0:27:13.200
available information for citizens, so anyone, in
any part of the world, can enter in their website

0:27:13.840,0:27:21.440
and in their platforms, for instance.
I know them, different ones, so there is one

0:27:21.440,0:27:31.280
that is called Terrabrasilis, a INPE platform for
deforestation, so they have data, they have graphs,

0:27:31.280,0:27:39.120
deforestation maps, dashboards data you can
download, and anyone can download that data,

0:27:40.400,0:27:48.960
and treat, can make analysis, can… I don't know,
play (I like to say I play with data).

0:27:48.960,0:27:57.200

So, have downloading, and try to handle, try to process, try to extract useful information.

0:27:58.080,0:28:05.280
Another institution that also has a wonderful work in public

0:28:05.840,0:28:15.280
data is called MapBiomas and it's annual. MapBiomas stands for

0:28:15.280,0:28:22.560
“Brazilian Annual Land Use and Land Cover Mapping Project”, so they produce a diverse

0:28:25.520,0:28:35.600
variety of maps for all biomes in Brazil, so they analyze how land use and lead cover is changing

0:28:35.600,0:28:40.320
in Brazilian biomass, which is very important in the Brazilian context,

0:28:41.200,0:28:48.400
because, particularity in Brazil, most of the greenhouse

0:28:48.400,0:28:55.280
gasses emissions from Brazil comes from land use, so meaning deforestation and

0:28:56.480,0:29:03.520
agriculture. So it's very important for Brazilian institutions

0:29:03.520,0:29:11.840

- and also for the public government - to monitor
how land use is changing in Brazil.

0:29:13.120,0:29:20.320
What else? I can also cite all the international initiatives, so satellites are also a

0:29:20.320,0:29:31.680
very powerful tool for monitoring climate related
data. As far as I know, NASA satellites have

0:29:31.680,0:29:39.920
open data, they have open portals. Again, anyone,
in all the world, can go to their websites,

0:29:39.920,0:29:47.600
open the maps, open the data they
have, they're very well treated and very

0:29:48.480,0:29:56.240
easy to handle. It's available for everyone.
Myself, in my research. I have used the

0:29:56.240,0:30:03.280
fire alert data for instance,
to monitor the day at the fire spots

0:30:03.840,0:30:12.160
in the Amazon… What else?
Well, I can stay longer talking about all kinds of

0:30:12.160,0:30:20.480
initiatives that are very fantastic,
they're very accessible, that have very quality

0:30:20.480,0:30:29.360
data, very transparent methodology, so they are
very well documented so anyone can go to the website,

0:30:30.000,0:30:37.840
read the methodology, read how they calculate each
of the parameters they are showing to us.

0:30:39.120,0:30:44.980
Okay, Thomas, your turn.

0:30:44.980,0:30:46.980
DR. BARTOSCHEK: Yes, thanks a lot, Milena, I can go on and I can tell and

0:30:50.000,0:30:55.840
congratulate you, or especially Brazil's open data policy. You've mentioned INPE and

0:30:55.840,0:31:02.720
we were working with INPE data already, a long time
ago, and it's really great, it was already at

0:31:02.720,0:31:08.880
that time. It's great to see how this can work.
Brazil has really an outstanding open data

0:31:08.880,0:31:16.720
policy already, for a long time, and I've even
checked, right before the episode here, I

0:31:16.720,0:31:22.720
checked on the websites of the Open Knowledge
Foundation, that there is the government open data

0:31:23.840,0:31:30.480

index and Brazil is amongst the top 10 countries
all over the world, while Germany is around place 30,

0:31:30.480,0:31:37.040
25 - 30, something like that. So it's really
a huge difference in how countries can work with that.

0:31:37.040,0:31:43.280
In Germany we then have another
issue, which makes things a bit more complicated,

0:31:43.280,0:31:50.320
which is the federal states here that have
different regulations about the openness of data.

0:31:51.120,0:31:56.400
Starting with maps and satellite pictures or
aerial photography, which is really very important

0:31:56.400,0:32:07.040
in the context of climate change projects
and science about it. So, it was only a few years ago,

0:32:07.040,0:32:11.280
at least in the State of North Rhine-Westphalia and here where we are situated,

0:32:11.280,0:32:19.680
this data was opened. I think 2017 was the year
where the maps and area photography was

0:32:19.680,0:32:24.160
available as “open data”. Before that it was very
difficult and expensive to work with that data,

0:32:24.720,0:32:31.600
so, this made life much more complicated. Another issue - in general here, not only for

0:32:31.600,0:32:39.280
Germany - is probably data findability.
Sometimes it is complicated and it takes time, where INPE

0:32:39.280,0:32:46.320
and Brazil already had the time to prepare
and to make a good accessibility

0:32:46.320,0:32:52.320
to these data sets, with good explanations, as
Milena said, on how to access this data, how to

0:32:52.320,0:32:59.040
download and get the data sets. Maybe access them
via interfaces, programming interfaces immediately

0:32:59.040,0:33:04.480
where documentation is very important and this
is a major challenge, because it's a lot of work

0:33:04.480,0:33:10.400
to prepare that, it takes time from the point
where a country or a governmental institution

0:33:10.400,0:33:15.760
decides to open the data, it's not done yet, you
know, you have to put a lot of work into that.

0:33:16.720,0:33:21.520
This is one point. The second point
is also when the governmental data is

0:33:21.520,0:33:27.440
online, then we go on, because it's
presented very differently to different

0:33:27.440,0:33:34.960
governmental institutions, and not only as it's
online and marked as “open” that makes it good,

0:33:34.960,0:33:38.960
and usable data, because you can imagine
if you have some PDF documents

0:33:38.960,0:33:46.720
marked as open data on the website of an
institution. Well, it's still a lot of work

0:33:46.720,0:33:52.320
to get it out, to do the Science
with this data. If it's in PDF documents,

0:33:52.320,0:33:57.920
you also need a machine to turn it into a readable format
and this, again, might be some work and some time.

0:33:57.920,0:34:04.320
Another example for that, from Germany,
maybe the German weather service. Now we are also

0:34:04.320,0:34:11.120
close to climate topics. The German weather service,
with a long history as a weather service itself,

0:34:11.760,0:34:18.560

collected data for a long time already, they
followed a law, a German law, I think in 2019,

0:34:18.560,0:34:24.480
where they needed… They were forced to open their
data sets. So they did that, of course, they

0:34:24.480,0:34:30.960
need to follow this law, but then the data
is available on FTP servers. Yes, so you have a

0:34:30.960,0:34:38.000
link “opendata.dvd.de” and then you are coming
on an FTP server so no lay person, I would say,

0:34:38.640,0:34:44.800
the citizens, they just need to click
through some kind of folders, with cryptic

0:34:44.800,0:34:49.520
names… It's not really understandable. And
we know, I know from Geoinformatics it would

0:34:49.520,0:34:56.800
be really easy to make this data available
as a map, to offer diagrams, to offer

0:34:56.800,0:35:02.320
visualizations of the data, immediately. It wouldn't be a problem, but well,

0:35:02.320,0:35:08.560
they only followed the law, the things they must do,
but not thinking that would make life easier and

0:35:08.560,0:35:15.040
understandable for the citizens.
This is a pity, I would like to say.

0:35:15.040,0:35:21.360
MS. VOIGT: I had a question for you, Thomas,
but before that, I was reading the _____

0:35:22.000,0:35:32.480
that was published now, in july
2021, that imposes that research data should

0:35:32.480,0:35:40.880
be also opened by default, and then my
question, I thought at the same time about the

0:35:42.000,0:35:50.160
_____. I entered the website and I was quite
surprised with the proposal of

0:35:50.160,0:35:59.760
this agency, which is to measure with an
interactive tool from many fields, as I can

0:35:59.760,0:36:10.320
understand, many different fields… Umweltbundesamt, it means, in English, “environmental office”,

0:36:11.520,0:36:18.160
federal office. So, I was quite impressed by that,
but at the same time, when I entered the website

0:36:18.160,0:36:23.680
I saw a lot of PDFs and I thought, “okay, maybe

I'm not using this right", because I also didn't

0:36:23.680,0:36:29.200
know what to look at, to be honest, so I was just
randomly seeing, to see how they were

0:36:30.960,0:36:39.600
making their data and I was quite "okay, this is a lot of information,

0:36:39.600,0:36:45.840
but it's not data". I mean, someone can use it,
of course, it is a good place to have

0:36:46.400,0:36:50.880
everything in the same place, but I was quite
confused, so I was going to ask you, if you

0:36:50.880,0:36:57.360
want you use it a lot, if I look at the wrong
place, or what do you think about this strategy?

0:36:58.400,0:37:04.320
I mean, we didn't talk about this earlier, but I'm curious now that we're talking about it.

0:37:04.320,0:37:09.120
DR. BARTOSCHEK: Yeah, it depends. I'm not exactly sure which kind, because

0:37:09.920,0:37:14.960
Umweltbundesamt, this is the German
Environmental Agency, I would call it, has of

0:37:14.960,0:37:20.000
course a lot of data sets, and a lot of topics they
care about, and really broad topics, so I'm not

0:37:20.000,0:37:24.880
sure where, but I'm pretty sure that
you found a lot of PDFs because this is

0:37:24.880,0:37:32.000
how it starts. I believe, as you said, plenty
of these laws in Germany are new and I've mentioned

0:37:32.000,0:37:38.560
open data for weather service in 2019, North
Honduras files for the maps and area photography

0:37:38.560,0:37:44.800
2017, so we are speaking of a few years, and it
starts with these steps.

0:37:44.800,0:37:51.520
And Germany is on the way. Late and a bit
slower, maybe, so I believe it's a start.

0:37:51.520,0:37:57.200
I can go back even some years and make a small
example from Münster, from the city of Münster,

0:37:57.200,0:38:03.280
where we started an open data initiative within
the city, coming from Science, from University.

0:38:03.280,0:38:12.240
We got in touch with someone with the city government
and the people from some kind

0:38:12.240,0:38:17.120

of an office for green spaces in the city, and
we asked them to open the data and they were:

0:38:17.120,0:38:22.480
“Oh no. Maybe the city can make some money and
sometimes we can't open… Okay we will do it.”

0:38:22.480,0:38:30.080
So what they did is they just put two Excel files on their
website about the places of playgrounds and sports

0:38:30.080,0:38:35.600
places in the city, or something like that, which
was not very valuable, but it

0:38:35.600,0:38:42.400
was a first step and this was, I think, more or less
10 years ago, and now, already since two years, the

0:38:42.400,0:38:48.640
city of Münster has an officer, an open data
officer, a person with a full position only

0:38:48.640,0:38:55.280
working for the city, to make data from the city
openly available, and accessible, and findable.

0:38:55.280,0:39:02.320
It was a way from reverse data sets, to
now having a person having an open data portal

0:39:02.320,0:39:08.720
for the city. A long way, 10 years. Maybe the
Umweltbundesamt is on this way, but not yet there.

0:39:09.280,0:39:15.280
MS. VOIGT: Yeah, I know, of course. It is much more difficult
to make this work all together. but I'm really

0:39:15.280,0:39:21.200
glad that you mentioned the city of Münster. I
participate in the Hackathon and they allow us

0:39:21.200,0:39:27.760
to see. They sent to us a lot of databases and I was
impressed by how many environmental databases are

0:39:27.760,0:39:35.600
found there. I think two things we
can say about what we've said so far is that: maybe

0:39:35.600,0:39:44.640
governments have to learn from examples like INPE,
or other agencies that Milena mentioned, of how we

0:39:44.640,0:39:52.560
can actually make data available, and also that
we are going in some direction.

0:39:52.560,0:40:02.000
We are mixing these two worlds, of citizens…
or better saying, a broader access of this data

0:40:02.000,0:40:07.200
for citizens that are not experts, and now
I would like to come back to something that

0:40:07.200,0:40:15.440

Milena said about capacity building, because
we've talked a lot about INPE, and she mentioned

0:40:15.440,0:40:26.000
satellite data and I actually work already with Sentinel.
"Work"...

0:40:26.000,0:40:33.280
I mean, I did a workshop, it was quite fun.
I've learned a lot, I coded and I saw the images

0:40:33.280,0:40:38.640
and they said "you can make a little
project of that, just to use the code, just to

0:40:38.640,0:40:44.480
practice". And I said "okay, what can I do
with that? I have no idea, I'm a political scientist".

0:40:44.480,0:40:52.560
Then I made a map of Brumadinho, the
area of Brumadinho which had a natural… I'm sorry,

0:40:52.560,0:40:58.240
it was not a natural disaster, it was an
environmental disaster, caused by a mining company

0:40:58.240,0:41:04.800
some years ago. So I took the satellite images
from before and after to see the spread of the

0:41:04.800,0:41:11.120
mud that came from this disaster, but then I was
thinking now, when I was listening to you both,

0:41:11.120,0:41:18.720
that: how can we actually make
local citizens, who are sometimes not

0:41:21.360,0:41:28.240
PhD students in atmospheric or special
or PhD students in general informatics,

0:41:28.240,0:41:33.680
how can we make them work with data once
this data is available, once there is this

0:41:33.680,0:41:40.800
opportunity? How would you share this
experience about creating capacity building?

0:41:42.800,0:41:50.560
DRA. PONCZEK: Okay, for sure training, having
people trained to have programming skills

0:41:50.560,0:41:58.960
it's a very important part of the open
data policy because, for sure, as you mentioned,

0:41:58.960,0:42:06.000
it's not that easy for our lay people
to just jump into our website or, let's say,

0:42:06.000,0:42:13.920
NASA or even INPE and download a database. It's
not that intuitive, so you need some background

0:42:13.920,0:42:22.000

before starting dealing with this data,
and I would say that satellite data it's

0:42:23.200,0:42:31.600
in the key data, because they are very powerful.
Again, you can, satellites can measure

0:42:31.600,0:42:38.640
almost all kinds of environmental
parameters we can imagine, but they are not

0:42:38.640,0:42:46.560
easy, they're not ready, understandable,
for lay people. I think

0:42:47.600,0:42:54.960
they stay much more in the research field
community, than for a regular public,

0:42:57.120,0:43:00.640
but one thing that I was thinking about

0:43:00.640,0:43:07.120
during the discussion is that sometimes
the raw data, let's say even if it's not raw, but

0:43:07.920,0:43:14.720
data in a data set, it's hard to understand for
lay people ,and for people that doesn't have a

0:43:15.440,0:43:23.920
programming background. I'm a
pretty good fan of reports, so I think a report

0:43:23.920,0:43:33.840
is a very useful framework that gives
transparency to organizations and to the public sector.

0:43:34.480,0:43:43.120
Sometimes we can't, that's the
thing, I can understand atmospheric

0:43:43.120,0:43:50.640
data, atmospheric]information, but I can’t
understand, let's say, procurement

0:43:50.640,0:43:58.720
information, so for me, as a lay person in this
field, I’d love to read reports. I think

0:43:59.280,0:44:10.480
it's important to the public administration
to produce a nice, beautiful, readable,

0:44:11.920,0:44:22.320
and complete report from these parameters
that are being measured, and needs to approach

0:44:22.320,0:44:27.840
civil society. What is
your opinion about that?

0:44:29.920,0:44:34.080
DR. BARTOSCHEK: I can maybe add to the question,
to Jessica's question?

0:44:34.080,0:44:40.720
On top of the reports and going a step back,

also you mentioned programming skills, which I find

0:44:40.720,0:44:46.080
really interesting and impressive and
really important to have for that,

0:44:46.080,0:44:52.800
but we can go even one step further and, as I've
mentioned in the beginning, I started this

0:44:52.800,0:44:58.400
journey here also in the Educational sectors, or
in schools even, not even higher education, but in

0:44:58.960,0:45:04.560
secondary, sometimes even primary education,
and there maybe even before programming skills

0:45:05.120,0:45:13.520
the general data skills or how we call it
"data literacy" is something we need to focus on

0:45:13.520,0:45:18.320
much more, already in school times, amongst the
youngest. Of course we all would need it and we

0:45:18.320,0:45:25.120
know now that there are jobs like data scientists
and whatever, so there will be more

0:45:25.120,0:45:30.960
people working on that, but we need to start earlier to teach data and literacy and

0:45:30.960,0:45:37.520

to have it as a basic skill amongst the
general skills of reading, writing and so on.

0:45:38.160,0:45:43.680
We do that with the Sensebox. On one side, we do that also in other projects,

0:45:43.680,0:45:48.480
recently we had a project called _____, we are still working on that,

0:45:48.480,0:45:54.960
and it's the climate data school, basically,
where schools participate and

0:45:56.480,0:46:04.880
the high school students, 12 year olds, more
or less, learn to collect data in different fields

0:46:04.880,0:46:11.200
that are related to climate change and it doesn't
have to be direct climate data, like temperature

0:46:11.200,0:46:17.520
data or whatever, but this indirect data may be much closer to what Milena said before:

0:46:17.520,0:46:24.880
data that helps us to understand how to release less greenhouse gasses, to change the

0:46:24.880,0:46:29.920
acting of the people… So, it might be data about the food and the canteens of the schools.

0:46:31.040,0:46:35.040
There is no data about that, but the high school students might start

0:46:35.040,0:46:41.200

to collect this data, open this data and work
with that data. And working with data means, then,

0:46:41.840,0:46:47.280
if they collected this data, they need to be able
to access it, to download it and then, maybe, start

0:46:47.280,0:46:54.080
really with the simple things, in a
spreadsheet Excel or whatever kind of system,

0:46:54.080,0:47:00.640
just to work with basic statistical things
that are possible in that time, in those ages

0:47:01.280,0:47:05.280
and then, go on and maybe come to the next
step, which would be the programming skills.

0:47:05.280,0:47:10.560
if you have a lot of data, you would even need more,
maybe scripting skills, and use some tools like

0:47:11.120,0:47:14.240
Python or whatever to dig
into the data and find

0:47:16.960,0:47:21.120
things that are not visible on the
first look, basically.

0:47:21.120,0:47:26.720
This is interesting, especially this extra
data, this indirect data related to climate change,

0:47:26.720,0:47:31.920
it is something where there is a lot of
potential concerning data literacy.

0:47:34.400,0:47:39.200
MS. VOIGT: I'm thinking… I made this
question because I was thinking more about

0:47:42.080,0:47:48.880
how can we make local interventions since
we have the data, because that is a problem,

0:47:48.880,0:47:55.040
governments have a lot of power, they do
have a lot of money, they do have a lot of agency,

0:47:56.000,0:48:03.120
but they, as we say, in the political science field,
they are like elephants, they move really slowly,

0:48:03.120,0:48:10.800
because they are heavy and we
cannot expect everything to be done by governments.

0:48:10.800,0:48:16.800
And I'm thinking about local interventions
that could be made using this data.

0:48:16.800,0:48:25.040
So that was also a little bit the spirit of this
question, it was a bit: "Can we use data, somehow,

0:48:25.040,0:48:29.840

if I’m not a specialist, in a way
that I can make local interventions?”

0:48:29.840,0:48:36.960
Maybe what Thomas mentioned,
to emit less greenhouse gasses

0:48:38.000,0:48:45.200
would be a way, or to make a building
more efficient. I don't know, I'm kind of

0:48:46.400,0:48:53.760
thinking out loud here, brainstorming here, but
I like to think that… I don't want

0:48:53.760,0:49:00.400
to remove the responsibility of government,
because we do know that most of the

0:49:00.400,0:49:09.200
polluted gasses and most of the problems have to
do with strategic national policies, but also

0:49:09.200,0:49:18.240
we could increase, or improve… (sorry)
We could improve our local environment and

0:49:18.240,0:49:25.760
I think small interventions that allow birds
to come back or trees to grow…

0:49:25.760,0:49:32.000
I don't know if i'm being naive by
saying that, but I have this…

0:49:33.440,0:49:38.720
this faith that most of the changes have to
be local base change.

0:49:41.535,0:49:44.399
But anyway, keep going.

0:49:44.399,0:49:51.040
DRA. PONCZEK: But of course, climate
change is such a complex issue that

0:49:51.040,0:50:00.160
all kind of levels must be involved: there
is the strategic and diplomatic sphere,

0:50:00.160,0:50:09.280
that create policies and big strategies, big
policies, global policies, national policies,

0:50:09.280,0:50:16.640
that must exist, but also I believe
that we, as citizens and as regular people,

0:50:16.640,0:50:26.640
also have some kind of power, or even if as individuals, as a community, as a group

0:50:26.640,0:50:35.360
of people that wants to do something right.
I think, again, another concept, another

0:50:35.360,0:50:43.040
interesting term is what Thomas,
actually, the work of Thomas is part of what we

0:50:43.040,0:50:49.760
call “citizen sciences” that it's like putting
people, citizens to produce science, to produce

0:50:49.760,0:51:00.640
data and it doesn't have to be, again as Thomas
also have said, it doesn't have to be

0:51:01.760,0:51:10.640
a very fancy kind of data, or very fancy
sensors. Sometimes people can just monitor.

0:51:10.640,0:51:17.440
For instance, the level of water in the reservoir. It
doesn't require any kind of sensors, it's just

0:51:20.640,0:51:27.120
“go there and check”, or another example
that I can think about: monitor the color of

0:51:27.120,0:51:35.760
the sky: “How is my impression of the sky today?”
Like, day 1, the sky was pretty blue, it was pretty

0:51:35.760,0:51:45.920
cloudy, or I saw some pollution or some particles
in the air… There is a variety of same

0:51:45.920,0:51:53.600
sensitive information that people
can start being familiar with, and that approach

0:51:54.160,0:52:03.040

to the idea of monitoring, of having data
management… I don't know. The odors, as well, like

0:52:03.680,0:52:10.560
you can put people too, if you have a community,
for instance, that live close to a factory

0:52:10.560,0:52:18.080
or to a big power plant or whatever, they can
simply monitor the odors of the air.

0:52:18.080,0:52:28.160
It’s something very simple and makes this kind of
proximity between individuals, and

0:52:28.160,0:52:34.960
having the same sense of data science,
as we call it in a fancy way, right?

0:52:36.960,0:52:43.280
DR. BARTOSCHEK: May I just come here, jump in and go on?
So, with the local intervention, these

0:52:43.280,0:52:48.160
are great, great examples for citizen science
projects, and we see the Sensebox and OpenSense,

0:52:48.160,0:52:54.480
as a citizen science project initiative
and maybe, as you said, this need for these

0:52:54.480,0:53:01.200
local interventions in cities. I see
the same and I believe that the citizens

0:53:01.200,0:53:07.680
want the change, they want a complete change,
the majority of the people, at least, and as you

0:53:07.680,0:53:13.440
said, the cities, the governments, are pretty slow
and have heavy ships to move and sometimes they

0:53:13.440,0:53:19.840
don't want to react immediately if some
citizens come around. I like a quote I found

0:53:19.840,0:53:25.600
here and there on twitter, and so: “People without
data have an opinion” and that's how cities

0:53:25.600,0:53:31.200
may take the citizens, saying: “Ah, you have to
change this and that because of that… this is an

0:53:31.200,0:53:37.680
opinion”, but people with data have evidence.
So, if people are facilitated to collect the data

0:53:38.240,0:53:44.880
and even to prove that it's good data, then they’ll
have evidence and can even foster this change

0:53:44.880,0:53:52.080
of a city government. I would like to make a
very recent example of a project we do right

0:53:52.080,0:54:01.520

now with Sensebox in Berlin, which is a kind of
intervention: When we think of

0:54:01.520,0:54:07.520
reducing CO_2 emissions, one good thing to do is
changing from cars to bikes, basically, and this is,

0:54:08.240,0:54:12.640
and we can agree I think on that, this would
be a really great intervention all over the

0:54:12.640,0:54:20.480
world, to do so if possible. But we
know about large cities having usually, not all but

0:54:20.480,0:54:27.200
usually, not good conditions for biking, in terms…
in a lot of terms: air quality, cars dangers and

0:54:27.200,0:54:32.640
so on and so on. So what we are doing right now
in Berlin: a group of citizens, 30 citizens, are

0:54:32.640,0:54:37.840
equipped with mobile Senseboxes. They are attached
to their bikes, they build them themselves

0:54:38.720,0:54:44.480
in a workshop with us and they are collecting
environmental data while riding, so on air quality,

0:54:44.480,0:54:50.560
for example, temperature as well, but also data that,
on the first look is not related to climate change,

0:54:50.560,0:54:55.680
on the second it is, so it they are collecting data
about the distance to the cars: “how close are the

0:54:55.680,0:55:03.920
cars coming?” And about how bumpy the road is,
about the quality of the road, basically, and they

0:55:03.920,0:55:09.120
collect this data while riding for a few weeks.
This data has been collected and available

0:55:09.120,0:55:14.080
as open data, on OpenSense Map and then, this group
of people can take this data and bring it to the

0:55:14.080,0:55:19.680
local government and we had in the workshop a
person from the district of Berlin that

0:55:19.680,0:55:26.160
said she is the person responsible for
bike lanes. “I can't decide which bike line

0:55:26.160,0:55:31.840
to do first, so I need data, but the city of Berlin does
not have the capabilities to collect this data.”

0:55:31.840,0:55:37.280
Now these two worlds meet, someone in the city
being slow, because there is no data, meets the

0:55:37.280,0:55:43.440

civic enthusiasts spiking into this, they are
collecting data, and now, we hope this can

0:55:43.440,0:55:45.939
change things in the city.

0:55:45.939,0:55:46.439
MS. VOIGT: I didn't know about this project, I really want to

0:55:49.920,0:55:57.520
know about this more. Eric Kill mentioned in a comment that I'm going to

0:55:57.520,0:56:05.360
bring it here: “Hi, at FMUSP (I think is the Faculdade de Medicina, if I'm not wrong, please correct me)

0:56:05.360,0:56:12.800
we have developed a low-cost equipment that we have
calibrated and we are using it to monitor cyclists.

0:56:12.800,0:56:17.987
Congratulations on the SenseBox initiative, Thomas.”
So this is a fan!

0:56:17.987,0:56:19.987
DR. BARTOSCHEK: Yes, I know Eric! Thanks a lot, Eric.

0:56:20.560,0:56:26.960
I know about his initiative, we are more or
less in touch. I have to respond to a message

0:56:26.960,0:56:30.217
so… hi to Eric!

0:56:30.217,0:56:32.217

MS. VOIGT: And I have a last question, our
time is going and I'm actually pushing

0:56:35.120,0:56:44.160
a little bit further, I hope you don't get upset
with me by doing that. But we have a last question:

0:56:44.160,0:56:55.440
So we have both goals for 2030 and 2050. Regarding this, I would

0:56:55.440,0:57:02.400
like to get your perspective: Is there any data
that we are not collecting and we should collect?

0:57:06.880,0:57:12.880
DR. BARTOSCHEK: So maybe just to change the order, I hope it's okay, Milena. So, I think the

0:57:12.880,0:57:19.360
last example I made with the bikes is a start.
So this data, there is no data like that

0:57:19.360,0:57:23.760
around, and we need to do that. There are also
no aims to collect this kind of data

0:57:23.760,0:57:30.240
from governmental science, as far as I know.
So this is one example of this somewhat indirect

0:57:31.040,0:57:36.320
linked data to climate change. I think
this is one example, there might be more

0:57:37.680,0:57:43.840

data on trees for example, knowing
where and how many trees are around, because

0:57:43.840,0:57:48.560
we always speak about some kind of mass,
and this is the other way around, where CO2

0:57:50.160,0:57:56.960
can get encapsulated, basically. I recently read a
paper of a colleague of mine that used AI methods

0:57:56.960,0:58:03.920
to count trees in the Sahara and they
had an impressive number of, I don't remember, two

0:58:03.920,0:58:09.200
billion trees in the Sahara, where one would think
there are no trees. And it's based on

0:58:09.200,0:58:16.240
satellite data, of course, and image recognition and so on. This was new to me completely,

0:58:16.240,0:58:23.040
new that there are so many trees in the Sahara.
And also this data is new, and then we need

0:58:23.040,0:58:30.560
more of this kind of data that is indirectly
related to topics, like biking or trees.

0:58:30.560,0:58:37.760
And for sure more, when I spoke about canteens,
food and here we come again back to Brazil.

0:58:37.760,0:58:43.920
Maybe Milena you can continue in that
direction, when we think about food production,

0:58:43.920,0:58:51.520
land use - that has a strong impact on climate
change, then again - and here we think about

0:58:51.520,0:58:59.680
deforestation that is being done in Brazil due
to how food is needed and how the

0:58:59.680,0:59:05.600
food consumption also in Europe works, you
know? If we could eat less meat, this would

0:59:05.600,0:59:12.320
have a strong impact on climate change. This would be one example where a lot of

0:59:12.320,0:59:18.068
data indirectly is involved in these questions. Or should be.

0:59:18.068,0:59:20.068
DRA. PONCZEK: Yes, for sure. We can cover it,

0:59:23.120,0:59:30.800
with more and more data related
to climate change, directly and indirectly speaking.

0:59:30.800,0:59:39.520
One thing that comes to mind, like just came
to my mind it's the need for more

0:59:39.520,0:59:51.360

regulation, so for instance, by now in Brazil,
companies are not… it's not mandatory

0:59:51.360,1:00:01.120
for companies to make greenhouse gasses
inventories, for instance. It's still voluntary, so

1:00:01.120,1:00:08.080
companies are starting to do that because
of international pressure, because of this whole

1:00:10.160,1:00:15.200
international discussion about the greenhouse
gas emissions, but it's not mandatory, so maybe

1:00:17.360,1:00:25.440
having more regulations, public regulations
and law about greenhouse gas emissions would

1:00:26.320,1:00:33.840
increase awareness, would increase the
collection of data, would increase the management

1:00:33.840,1:00:39.040
of these emissions in the federal perspective.

1:00:40.720,1:00:46.000
And this is not just for greenhouse
gas emissions, not for atmospheric conditions.

1:00:46.000,1:00:52.400
In Brazil, for instance, - and this is
what I work with, with air quality -

1:00:53.120,1:01:03.360
we have very little monitoring. Not all state
agencies have the capacity of measuring

1:01:03.360,1:01:09.600
air quality parameters. For instance, I know that
in the State of São Paulo there has been that,

1:01:09.600,1:01:16.560
it's the Environmental Agency of the State of
São Paulo. They have a very good infrastructure

1:01:16.560,1:01:24.160
for measuring all kinds of air pollutants. The data
is available, it's open, they have very good reports,

1:01:24.160,1:01:30.320
but it's not the reality for all states in Brazil.
For instance, in the Amazon

1:01:30.320,1:01:42.480
State they probably don't have this degree
of often control in air pollutants,

1:01:42.480,1:01:49.600
and it's a region that it's in the core of the
discussion, so they need to improve their

1:01:49.600,1:01:56.240
infrastructure, their capacity to measure and
to monitor air quality: that it's a way of knowing

1:01:56.240,1:02:02.400
if biomass burning is occurring, if

deforestation is happening all around

1:02:02.400,1:02:06.066
them. But just to mention some examples.

1:02:02.400,1:02:06.066
MS. VOIGT: Well, our time is up and our extra time is up.

1:02:12.560,1:02:19.840
So I would like to thank you, Milena Ponchak
and Thomas Bartosheko for being with us today.

1:02:21.920,1:02:28.480
DR. BARTOSCHEK: Yes it was a pleasure.
Thanks a lot for the invitation and thanks Milena for the

1:02:28.480,1:02:33.076
great talk and the insights into your work.

1:02:33.076,1:02:39.126
DRA. PONCZEK: Thank you too, Jessica and Thomas, it was very insightful.

1:02:39.126,1:02:46.541
I've learned a lot. It's wonderful to have people from different backgrounds discussing a common subject.

1:02:46.541,1:02:48.471
I appreciate it all.

1:02:48.471,1:02:54.080
MS. VOIGT: And finally, I would like to thank you who is watching us today,

1:02:54.080,1:03:01.200
for taking your time to be part of this
discussion. Data Talks is a series of talks between

1:03:01.200,1:03:07.200
experts from Brazil and Germany, who discuss
the use of public data in today's society.

1:03:07.200,1:03:12.800
The Data Talks is an initiative from myself, Jessica Voigt, as part of the German Chancellor Fellowship,

1:03:12.800,1:03:18.240
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1:03:18.240,1:03:27.901
of the University of Münster, in the framework of the strategic partnership project wwusp, funded by the DAAD.

1:03:27.901,1:03:31.801
I will see you in the next talk.
Have a nice weekend.