Dictionary of terms for interdisciplinary work in astrophysics, Earth sciences, biology, philosophy, modern languages, and international relations

When editing, please indicate if your input is Earth-science, Biology, Statistics, Math, Philosophy, Social Anthropology, Astronomy etc. related if more that one definition/understanding exists.

architecture:

- **of a planet:** how much of which material makes up the planet structure resulting in bulk density, atmosphere (compositional state, planet interior structure)
- **of a planetary system**: dynamical architecture, orbital parameters, kind and masses of star and all planets

astronomy
Astro: understanding the origin of galaxies, stars, planets, all bodies in the universe the study of their formation and evolution with observational means

astrophysics
Astro: applying our knowledge in fundamental science (physics, chemistry, math) to objects and processes on astronomical scales (time, distance, extension)

atmosphere: observable gaseous layers of a planet or a star

thick atmosphere: higher atmosphere mass

AI

Basalt
= ocean crust

biology
Astro: understanding life

bulk density: mean density of solid body (e.g. rocky planet). Total mass divided by volume.

cloud
made of small droplets, particles, aerosols

composition is different for different planets

differentiation:

- Biology: things become different from each other
- Astronomy: going from well-mixed (asteroid) to separated (in different layers)
- Mathematics (easy because well-defined)

ethical

ethics

Earth
Our planet: Earth mass, Eat radius, Earth bulk density, Earth climate, Earth continent-to-ocean ratio

Earth-like: Possibly the most mis-used adjective in exoplanetary science. No exoplanet that is truly Earth-like (in the sense that terrestrial life forms could thrive or even survive on its surface) has yet been discovered. A planet may carelessly be described as Earth-like if any among the following physical characteristics resembles that of Earth: radius, mass, bulk density, equilibrium temperature. Beware.

Earth sciences:
Science focused on Earth stuff

Exoplanet: any planetary body outside our own solar system, usually orbiting a star other than the Sun.

element: H, He, Li, …, C, N, O, …, Na, Mg, Al, Si, …, S, Cl, …, K, Ca, …, Ti, …, Mn, Fe, …, Ni, ... as in the periodic table of elements.

element abundances: the amount of a particular element (by number), often given relative to hydrogen. Typical values (-> solar abundances) are 1 for H by definition, 0.09 for He, 3.E-4 for C, 7.E-5 for N, 5.E-4 for O, 4.E-5 for Si and Mg, and 3.E-5 for Fe. These values are typical for stars and protoplanetary discs. Planetary atmospheres, however, can have very different element abundances. Measurements of stellar element abundances are easy for stellar temperatures T_{eff}> 4500K, but get increasingly more difficult at lower temperatures, where the spectral lines get blended
with each other and mixed with molecular lines for cooler stars (like M dwarfs).

Flux: Power received from or emitted by an astronomical object per unit surface area. The flux received from the Sun at Earth is about 1400 watts per square metre.

fugacity:
-- describes the imaginary availability of reactive gases in rocks?
-- something to do with bonding sites and somehow linked with availability of oxygen??

GCM:
global climate model
general circulation model

Granit
= continental crust

Humidity: p(H2O)/pvap(H2O)

- Supersaturation ratio S

Ice:
Geo & Astro: Solid state of water (H2O)
Astro: solid state of CH4, H2O and CO

Interdisciplinary
between classical disciplines
can't be done alone by one discipline

Intelligence
(Trump does not have it)

life

machine learning

metal: everything heavier than He (astrophysics)

moist atmosphere: number of H2O molecules in a gas
(see also **humidity**)

noon

network
in Anne's work: ?

philosophy

phylosilicates
vs. hydrated rocks

Planet
formed as by-product of a star, orbiting a star

planets in the solar system = planets as the planets in the solar system are

Radial velocity: The rate of change of distance of an object from the observer. This can be measured from the change in the frequency of light emitted by an object due to its motion toward or away from us, otherwise known as the Doppler effect. A star orbiting around its common centre of mass with an unseen planet shows a sinusoidal variation in radial velocity with time. The cycle time and amplitude of this “wobble” in the frequencies of spectral lines received from a planet-host star reveals the orbital period and a lower limit on the mass of the planet.

satellite
a body orbiting another body

serpentivity: how water gets into rock under high pressures?

SETI: acronym for Search for Extraterrestrial Intelligence.

silicate: group of minerals based of SiO2 with tetrahedron structure. The pure form of SiO2 form would be “quartz” (crystalline) or “silica” (amorphous). Silicates, however, have cations of other elements included, in particular Mg, Fe, Ca, Al, Na, K. Most common (for the solar set of element abundances) are the **magnesium silicates**, e.g. MgSiO3 (enstatite) and Mg2SiO4 (fosterite).

Signature: a uniquely identifiable pattern in data that can be associated with a particular phenomenon. The characteristic patterns of infrared absorption lines of distinct atoms, ions or molecules in astronomical objects are the signatures of those species. A flat-bottomed dip in the light of a star, lasting a few hours, is the signature of a transiting object (sse transit).

Space

Species: in the context of astrophysical gases, distinct types of ion, atom, molecule are commonly referred to as “species”

Spectrum: (1) In optics, the result of dispersing electromagnetic radiation and recording the variation in received flux as a function of wavelength or frequency.
(2) In signal analysis, the result of analysing the frequency structure of any experimentally-observed data series such as a series of brightness or radial-velocity measurements.

structure
a stable pattern

term
Astro: mathematical expression, part of an equation

Transit: (1) an event in which a smaller astronomical body crosses the line of sight to a larger one, causing partial obscuration of the larger body.
(2) the moment when an astronomical body crosses the local meridian of a terrestrial observer. For a star, this is the moment at which it reaches its highest daily elevation in the sky.

transit method: detection method for exoplanets (other methods are the radial velocity method and through microlensing)

WETI