	"Top Level" Information				
Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, the responder's name and, the new version number if implementing any changes)*
Pre -stage 3	Alistair Sellar	UK Met Office Hadley Centre	toplevel - coupling	It is not clear where to include information on coupling between model components. Some of this is potentially scientifically relevant to data users. For example, in HadGEM3 the sea-ice surface exchange calculations are carried out within the atmosphere not in the sea-ice model. We could put this information in the sea-ice component or atmosphere component or toplevel, but we think it's important that there is consistency between models, so would appreciate a recommendation. Myself and the one other person who expressed an opinion felt that it would be betterto have the coupling information in the toplevel to avoid duplication and inconsitency.	We have added a CIM property and class to store couplings (https://github.com/ES-DOC/esdoc-cim-v2-schema/blob/master/science_classes.py#L30). These will, in general, not be specialized, but will be collected separately (e.g. notebook, spreadsheet) and injected into CIM documents by ES-DOC. That said, some coupling questions, in particular those that involve more than two realms, will be asked in the toplevel key_properties. (0.5.0) David Hassell
Pre -stage 3	Alistair Sellar	UK Met Office Hadley Centre	toplevel - tuning	We felt that the tuning section was broadly very good, and avoided potential pitfalls, such as asking which parameters were tuned (which we couldn't answer because that's not (always) how we do it). Some suggestions: 1. it would be good if there was somewhere to reference a paper which describes the model's tuning methodology in more detail. The WCRP tuning workshop in 2014 and Hourdin (2016) paper recommended that model description papers describe tuning more explicitly, so these should be useful sources of more information.	Each realm process can have a have any number of citations attached to it. David Hassell
Pre -stage 3	Alistair Sellar	UK Met Office Hadley Centre	toplevel - tuning	2. Could you change "metric" to "metric/diagnostic" in the "description" text? A metric is a single scalar value, but much of our tuning is more subjective, e.g. comparing patterns of diagnostics. In a similar spirit, global_mean_metrics_used should be global_metrics_used, because metrics of variability are just as valid as global means.	Fixed (0.5.0) David Hassell
Pre -stage 3	Alistair Sellar	UK Met Office Hadley Centre	toplevel - tuning	3. Can you be more exlpicit about energy_balance and fresh_water_balance. Presumably the former is abuot the tuning to achieve radiative balance at TOA. But is the water question sounds more like it should be in the conservation section, unless I'm missing it's meaning. What aspect of the water cycle might be tuned?	The tuning section is more about how nalance was achieved, and the conservation section is more about the properties of the balance (or lack there of). The question descriptions have been updated to reflect this better (0.5.0) David Hassell
Pre -stage 3	Øyvind Seland	MET Norway	top-level-technical	Have you given thought on how to present two model versions used for CMIP but with small technical differences, e.g. resolution and tuning.Related problem. Will it be possible to copy / link in documentation that are identical for the model versions?	This is most certainly possible. Before describing a model, we ask how you would like to initialize its documents, for each realm (toplevel, ocean, atmosphere, etc.) there is a choice of A) create from scratch; B) initialize to the answers from a particular CMIP5 model; and C) initialize from a particular CMIP6 model. Once initialized, and minor edits can be made prior to publishing the final document. David Hassell
Pre -stage 3	Øyvind Seland	MET-Norway	top-level aerosol-provision	One aerosol type may have several categories of sources. Should that be included as an additional category by the user. Or category "mixed" and then give more information below E.g for organics we use M+E	You can select multiple entries from the list of forcing provisions, so this is already catered for. I have updated the description to make this clear to someone entering data. (0.5.0) David Hassell
Review phase 3	David Neubauer	ETH Zürich	Toplevel - Radiative forci	Cloud albedo effect and Cloud lifetime effect are called RFaci and ERFaci in AR5. The AR5 terminology could be added in the description.	Done. (0.5.0) David Hassell

Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, the responder's name, and the new version number if implementing any changes)*
		Realm: Atmosphere			
Pre -stage 3	Bruce Wyman	GFDL	key properties	We use a different timestep for shortwave and longwave radiative transfer. It would be nice to have separate questions, but putting them both on the same answer (e.g. "longwave = 3 hours, shortwave = 1.5 hours") is doable.	Made separate entries for longwave and shortwave radiative transfer timesteps.
Pre -stage 3	Jeff Ridley	Met Office	radiation	The options under LW gases and SW gases are not appropriate and look like they have been copied from the aerosol component	removed optical methods for sw_gases and lw_gases
Pre -stage 3	Robert Pincus	University of Colorado (RFMIP)	radiation	I agree with Jeff Ridley's point above - since the spectral integration is defined in the _radiation node, there is no need for optical methods for [ls]w_gases. (What's currently there is inappropriate.)	removed optical methods for sw_gases and lw_gases
Pre -stage 3	Robert Pincus	University of Colorado (RFMIP)	radiation	"Greenhouse gases" should be made specific to LW and SW. This is because some models may treat, for example, the LW effects of CH4 but not the SW effects	Users will give separate answers for sw_ghg and lw_ghg representations.
Pre -stage 3	Robert Pincus	University of Colorado (RFMIP)	radiation	The CMIP6 protocol offers three options for specified greenhouse gas concentrations (see section 2.1.10 of doi:10.5194/gmd-2016-169). The list of greenhouse gases used here should be harmonzied with this protocol (although as yet the future protocol is not specified)	Updated the questions about GHGs in the radiation scheme to account for the 3 protocols in section 2.1.10 of doi:10.5194/gmd-2016-169. Uses will now provide information about the complexity of GHG representation.
Pre -stage 3	Robert Pincus	University of Colorado (RFMIP)	radiation	For liquid clouds, optical_methods cloud be restricted to Mie theory and geometric optics. The other methods are used only for non-spherical particles	New enumeration for cloud liquid optical methods.
Pre -stage 3	Robert Pincus	University of Colorado (RFMIP)	cloud_scheme	The entries under cloud_inhomogeneity describes methods used to calculate radiative transfer. This should be moved to lw_ and sw_ nodes under radiation	moved cloud_inhomogeneity to the radiation scheme as lw_cloud_inhomogeneity and sw_cloud_inhomogeneity.
Pre -stage 3	Robert Pincus	University of Colorado (RFMIP)	cloud_scheme	There should be a sub_grid_scale_ice_distribution that mirrors the node for water	added sub-process for sub_grid_scale_ice_distribution
Pre -stage 3	Robert Pincus	University of Colorado (RFMIP)	radiation	It would be surprising if the general_interactions for each component (which will be emission/absorption and possibly scattering) will vary across components (aerosols, cloud ice, cloud water). Unless modeling centers suggest otherwise I'd suggest this node moves to e.g. shortwave_radiation.	Moved the general_interactions property for aerosols, cloud water and cloud ice sub-processes of shortwave_radiation and longwave_radiation up to sit within the main shortwave and longwave radiation processes. Commented out sub-processes for shortwave_gases and longwave_gases because general_interactions was the only property under each of these.
Pre -stage 3	Robert Pincus	University of Colorado (RFMIP)	cloud_simulator	This is more appropriately called "observation_simulator" or "observation_proxy"	Changed name of this component to atmos_observation_simulation. Updated the description to "Characteristics of observation simulation".
Pre -stage 3	Steve Garner	GFDL	grav waves - orog	Suggest option for treatment of anisotropy, probably in 35.2. Dissipation scheme (presumably means deposition scheme?) could include wave saturation vs Richardson number vs other options. There are different treatments of boundary layers and partial ducting which don't seem to fit anywhere, except maybe in propagation mechanisms. I'm not sure what "calculation method" is getting at, but "nonlinear calculation" is not a very useful header in that section.	Added 'wave saturation vs Richardson number' to dissipation mechanisms. I think dissipation scheme (not deposition scheme) is the correct term in this context, the dissipation of gravity waves will result in momentum deposition. I'm not sure from this comment where to address gravity wave anisotropy. Is this a reference to the source mechanisms (anisotropic source spectrum) or wave propagation (anisotropy of propagation) or both? Added boundary layer ducting to orographic_gravity_wave_propagation_scheme
Pre -stage 3	Ming Zhao	GFDL	deep convection	It is not clear what this exactly mean. Does this mean closure method for determining cloud-base mass flux. If yes, one may want to ask CAPE/WFN based or TKE/CIN based (i.e., quasi-equilbrium of free troposphere or quasi-equilibrium of boundary layer)?	Updated enumeration for deep_convection_scheme_method to include 'CAPE/WFN based' and 'TKE/CIN based' closure methods.
Pre -stage 3	Ming Zhao	GFDL	deep and shallow convection	We should add descriptions for convective microphysics, which is very important for simulations of both present-day climate and climate sensitivity (e.g., Zhao 2014 and Zhao et. al 2016).	Added a 'microphysics' property to deep_convection and shallow_convection with the enumeration: 'tuning parameter based', 'single moment', 'two moment'.
Pre -stage 3	Ming Zhao	GFDL	deep and shallow convection	Does vertical momentum transport mean if the scheme carries a vertical velocity equation or does the scheme transport large-scale vertical momentum? if latter, one may need to add if the scheme carry a vertical velocity equation.	This is about whether the convection scheme includes the vertical transport of momentum. The questions is to do with listing the physical processes that are represented by the convection scheme rather than how the scheme is encoded.
Pre -stage 3	Ming Zhao	GFDL	deep and shallow convection	Add a description on re-evaporation of convective precipitation.	Added re-evaporation of convective precipitation to deep_convection_scheme.processes and shallow_convection_scheme. processes
Pre -stage 3	Ming Zhao	GFDL	microphysics	In most GCMs, separate microphysics schemes are used in moist convection and large-scale clouds. Should we move the descriptions of microphysics under large-scale cloud scheme and convection scheme?	Changed the description of the atmos_microphysics_precipitation component to "Large Scale Cloud Microphysics and Precipitation". Changed the name of the cloud_microphysics sub-process to large_scale_cloud_microphysics. Note that we now also ask for information about microphysics scheme included in deep and shallow conveciton.
Pre -stage 3	Ming Zhao	GFDL	cloud scheme	It may be better to separate the radiative effects of cloud representation (i.e., optical properties: overlap assumption, inhomogniety) from other properties of cloud scheme?	Moved cloud_overlap_method from a property of the toplevel to a property of a new sub-process called optical_cloud_properties. Added an additional property cloud_inhomogeneity to the sub-process optical_cloud_properties.
Pre -stage 3	Ming Zhao	GFDL	cloud scheme	add entry for prognostic or diagnostic scheme, in the case of prognostic scheme, what are those prognostic variables, cloud amount, liquid, ice, rain, snow et.al.	Added prognostic_scheme, diagnostic_scheme boolean properties to the toplevel. Added a prognostic_variables property to the top level with possible attributes: cloud amount, liquid, ice, rain, snow.
Pre -stage 3	Lucas Harris	GFDL	horiz grid discretisation	Scheme order should be "second", "third", or "fourth"	Changed grid discretisation:horizontal scheme_order parameter from string type to enumeration type with options: second, third, fourth
Pre -stage 3	Lucas Harris	GFDL	horiz grid discretisation	Many modern grids, particularly the cubed-sphere used by GFDL's AM3 and AM4, do not have any poles at all. This would be better to be a "grid type" question, with values such as: Gaussian grid, Latitude-Longitude grid, Cubed-sphere grid, Icosahedral grid	Changed response type for horizontal pole so that users can leave blank if not appropriate for their model. Added grid_type attribute to discretisation: horizontal with options: Gaussian, Latitude-Longitude, Cubed-Sphere and Icosoahedral.
Pre -stage 3	Lucas Harris	GFDL	vert grid descretisation	should include "Vertically-lagrangian hybrid-pressure" to cover GFDL, NCAR, and DoE models.	Added "hybrid pressure" and "vertically lagrangian" to the discretisation: vertical coordinate_type options.
Pre -stage 3	Lucas Harris	GFDL	dy core - advection tracers	Conserved quantities should include "tracer mass" in addition to "dry mass" as a conserved quantity.	Added "tracer mass" to the options for advection_tracers conserved_quantities.
Pre -stage 3	Levi Silvers	GFDL	cloud_simulator	I agree with Robert's comment above, that 'cloud simulator' is not the best terminology, I would follow his suggestion for 'observation simulator' instead, or perhaps 'satelite simulator'. Although 'satelite simulator' may be too restrictive for future components of COSP.	Changed name of this component to atmos_observation_simulation. Updated the description to "Characteristics of observation simulation".
Pre -stage 3	Levi Silvers	GFDL	cloud_sim 30.1	Top Height Estimation Method' would be more clear than 'Top Height'	Updated isscp_attribute property top_height to top_height_estimation_method
Pre -stage 3	Levi Silvers	GFDL	cloud_sim 31.3	Is this meant to be the number of subcolumns that cosp uses to simulate subgrid variability? If so this should be made explicit.	Updated cosp_attributes property number_of_columns to number_of_sub-columns
Review phase 3	David Neubauer	ETH Zürich	cloud_scheme	Atmos Coupling: an option for atmosphere_aerosol_microphysics should be added as many models compute aerosol-cloud interactions (AerChemMIP) and those two schemes need to be linked therefore	The atmosphere_cloud_scheme already has an option to specify coupling to atmosphere_microphysics_precipitation. The aerosol component "aerosol_model" has an option to specify coupling to "clouds".
Review phase 3	David Neubauer	ETH Zürich	cloud_scheme	Prognostic variables: add options for cloud droplet number concentration and ice crystal number concentration to have the use of two-moment cloud microphysics schemes documented	added prognostic variables: "cloud droplet number concentration" and "ice crystal number concentration" with explanatory text: "to document the use of two-moment cloud microphysics schemes.
9 April	Mark Elkington	MOHC	radiation	topic: radiation, subtopic: shortwave radiation - duplicate overview property	Removed the overview property from the shortwave_radiation process as this will be inserted at a later stage.
10 April	Mark Elkington	MOHC	radiation	subtopic: longwave radiation - duplicate overview property	Removed the overview property from the longwave_radiation process as this will be inserted at a later stage.
10 April	Mark Elkington	MOHC	cloud_scheme	id: cmip6.atmos.cloud_scheme.scheme_type - missing choice "other"	cmip6.atmos.cloud_scheme.scheme_type is an open enumeration so the "other" property will be added to the list during the rendering process.

| 10 April | Mark Elkington | MOHC | grid | id: cmip6.atmos.grid.discretisation - duplicate overview property | Removed the overview property from the grid discretisation section as it will be inserted at a later stage. |

Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, responder's name, and the new version number if implementing any changes)*
	Realm: Ocean				
Pre-stage 3	Chevallier	CNRM	Ocean	I suggest to move "uplow_boundaries.free_surface.scheme" to Priority 1.	agreed [EG]
Pre-stage 3	Chevallier	CNRM	Ocean	There is no section on "ocean_atmosphere_exchanges" to document flux parameterization or coupling with the atmosphere (coupler? implicit/explicit? single flux over ocean-sea ice or double flux?). Could be under "boundary_forcing".	These questions will appear in the toplevel realm. [EG]
Pre-stage 3	Hallberg	GFDL	Ocean	It seems to me that section 14. should be "Baroclinic Momentum", not "Barotropic Momentum", as barotropic momentum is already covered under section 13, "Barotropic solver", and there is no other section covering the baroclinic momentum timestepping algorithm.	This section has been entirely revised. [EG]
Stage 3	Alistair Adcroft	NOAA-GFDL	ocean-key properties Conservation > Scheme	Salt appears as option but not heat or a temperature analog? What about other tracers?	Other choices are allowed (Enum is open)
Stage 3	Alistair Adcroft	NOAA-GFDL	ocean-grid Discretisation > Vertical	Hybrid/ALE is not consistent with other choices. ALE is an algorithm while the other choices are coordinates. I suggest removing Hybrid/ALE or replacing it with just "ALE" if it can be selected along with the other choices.	Hybrid/ALE removed [v 0.8.0]
Stage 3	Alistair Adcroft	NOAA-GFDL	ocean-key properties Seawater Properties > E	We will need "Wright, 1997" to be an option.	Added [v. 0.8.0]
Stage 3	Alistair Adcroft	NOAA-GFDL	ocean-grid Discretisation > Horizont	Finite volume also has staggering, eg. Finite volume/C-grid. I suggest making "Finite differencing" its own choice, and add "Unstagger (Arakawa A-grid)".	properties decoupled into 2 questions [v 0.8.0]
Stage 3	Alistair Adcroft	NOAA-GFDL	ocean-advection Lateral Tracers > Flux Li	The word "vertical" appears in the question but should be "lateral".	corrected [v 0.8.0]
Stage 3	Alistair Adcroft	NOAA-GFDL	ocean-advection Lateral Tracers > Type	The list of advections scheme is likely to be much longer than just those given. I think it might be easier and more useful to know: i) the nominal order of the scheme (int); ii) whether it is limited (bool); iii) effective order of limited scheme (float); iv) descriptive text label for scheme (e.g. MUSCL, PPM-H5, ...) (str); v) doi reference for scheme (str).	Specialisations for lateral tracer changed as suggested [v 0.8.0]. refs and DOI are handled via a separate process
Stage 3	Alistair Adcroft	NOAA-GFDL	ocean-lateral physics Tracers > Eddy Viscosity	The entire group "Tracers > Eddy Viscosity" should be "Tracers > Eddy Diffusivity".	Changed [v 0.8.0]
Stage 3	Alistair Adcroft	NOAA-GFDL	ocean-UpLow Boundarie Free Surcae > Scheme	There should be a fully explicit choice. Or is "semi-explicit" meant to be "split-explicit"?	Added [v. 0.8.0]
19-4-2018	Mark Elkington	MOHC	ocean-UplowBoundaries		Question clarified in v 1.0.4
sept 2018	Mark Elkington	MOHC	vertical physics	We were unclear how to respond to the following property	
				Vertical Physics > Interior Mixing > Shear Mixing - Is there interior shear mixing?	
				Does this mean "is interior shear mixing explicitly parameterised"? Does it have a particular meaning? The turbulent closure implicitly includes shear mixing as a TKE source term. Does this qualify? It is important to note that there is no distinction between the surface boundary and internal ocean in terms of vertical mixing in NEMO.	
2019-04-02	John Scinocca	CCCma		One item that would be helpful to see is whether models' oceans include the thermodynamic consequences for the phase change (melting) of solid precipitation (snow) on open water portions of the ocean. I didn't see this in the ocean spread sheet. This process accounts for a global-mean time-mean cooling of ~0.6W/m^2 in our preindustrial control. In interpreting individual CMIP6 results from different modelling centres, it would be helpful to know whether this process was included or not.	

	Realm: Sea Ice				
Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, the responder's name, and the new version number if implementing any changes)*
Pre-stage 3	Chevallier	CNRM	SeaIce	There is no section on "seaice_atmosphere_exchanges" to document flux parameterization or coupling with the atmosphere (coupler? implicit/explicit? single flux over ocean-sea ice or double flux?).	All realm-to-realm coupling will be dealt with a new "realm_coupling" component the top level. (RP: 2017-10-02)
Pre-stage 3	Chevallier	CNRM	SeaIce	Same for the seaice_ocean_exchanges (though it is partially covered by "cmip6.seaice.thermodynamics.energy.basal_heat_flux").	All realm-to-realm coupling will be dealt with a new "realm_coupling" component the top level. (RP: 2017-10-02)
Pre-stage 3	Salas y Mélia	CNRM	SeaIce	Sea ice enthalpy should be in the list of prognostic	Added as prognositic variable (RP 28/06/2017)
Pre-stage 3	François Massonnet	UCL	sea ice	Discretisation > Vertical > Layering. Please specify whether you refer to snow or ice layers. I assume that "Two-layers" means one of ice plus one of snow?	Clairified (RP 21/11/2017)
Pre-stage 3	François Massonnet	UCL	sea ice	Sea Ice Categories > Other: In the Description, you can give the example of models that paramterise the ITD (they don't have an explicit ITD but assume a certain distribution, and fluxes are computed accordingly)	Included (RP 21/11/2017)
Pre-stage 3	François Massonnet	UCL	sea ice	Redistribution: Description: add "... can redistribute sea ice thickness", not "sea ice" only	Clairified (RP 21/11/2017)
Pre-stage 3	François Massonnet	UCL	sea ice	Rheology: "Aniostropic" --> "Anisotropic"	Corrected (RP 21/11/2017)
Pre-stage 3	François Massonnet	UCL	sea ice	A section is missing on whether the model has an explicit or parameterised floe size distribution, and whether it is independent or coupled to the ITD	Included (RP 23/11/2017)
Pre-stage 3	François Massonnet	UCL	sea ice	The Energy > Heat content of precipitation section makes me think that we should also know if precipitation that falls on sea ice affects eventually the ocean surface salinity.	Included (RP 23/11/2017)
Pre-stage 3	François Massonnet	UCL	sea ice	Sections describing standard parameter values (snow density, P*, bare ice albedo; drag coefficients) would be very welcome	Included (RP 4/12/2017)
2017-11-23	Mark Elkington	MOHC	sea ice	In our models a few of the sea-ice variables (fluxes mostly) are reported on the atmosphere grid, while the remainder are reported on the ocean grid. When responding to the grid properties for the seaice specialisation how would you like us to deal with the fact we have two grids. My assumption is that we would report the ocean grid and then use the description section to indicate that some variables are reported on the atmosphere grid.	Your assumption is correct please use the description section to list what fluxes are reported on the atmosphere or ocean grid (RP: 2017-11-23)
2017-11-23	Mark Elkington	MOHC	sea ice	What is expected in KEY PROPERTIES / subprocess [Conservation] / Property [Budget: For each conserved property, specify the output variables which close the related budgets [str 1.1]]. In the previous question they have selected "Energy", "Mass" and "Salt" as the conserved properties. This property is now asking them to provide a list of all output variables which close the related budgets. They have two problems. 1) Some of the conserved properties have a long list of output variables used to close budgets 2) Its not clear how to format this information in a single string field Could you provide some guidance on how they should respond please – an example would be great. I note that there are other questions like this in other specialisations so your response will likely be relevant to all of these.	A note has been updated to state that (where possible) the terms that close the budgets should be specified as a comma separated list of variables. (RP 2017-12-04)
2018-03-14	Mark Elkington	MOHC	Sea Ice	I have just downloaded what I assume is v1.0.0 of the sea ice specialisation. On line 1245 we have a subprocess in Key Properties called Key Parameter Values. The first property an enum which is labelled "Typical Parameters" with a description of "what values were specified for the following parameters". The enum only lists the parameters (e.g. ice strength, snow conductivity etc.) - it doesn't allow a user to provide a VALUE for those parameters. Should the enum values be simply be a list of separate properties. Also in the following property "Additional parameters" the question asks for a comma separated list - would it be useful to clarify the format as something like "parameter: value, parameter: value, etc.".	Resolved as suggested
2018-03-16	Mark Elkington	MOHC	Key Properties	In Key Properties called Key Parameter Values: The first property is an enum which is labelled "Typical Parameters" with a description of "what values were specified for the following parameters". The enum only lists the parameters (e.g. ice strength, snow conductivity etc.) - it doesn't allow a user to provide a VALUE for those parameters. Should the enum values be simply a list of separate properties, or is there some other way this property is supposed to be interpreted.	same issue as above RP 2018-03-16
2018-05-30	Mark Elkington	MOHC	seaice	cmip6.seaice.thermodynamics.energy.fixed_salinity_value - this property type is defined as a "float", but requests a value for each sea ice layer a return of 1.078, 2.345, 3.456, 4,567 which is what is required is not a float. Will the import parsing handle multiple float values or should this be set to some string type with an indication that multiple floating poijt values need to be provided.	The schema needs mofiication to allow this, ES-DOC team are working on this. RP
2018-11-14	Martin Vancoppenolle	IPSL		2.3.1 - Overview of properties of seawater relevant to sea ice in seaice model => The question is too vague, cannot answer.	To be removed by ES-DOC team (RP 29-11-2018)
2018-11-14	Martin Vancoppenolle	IPSL		2.4.4 - Number of horizontal gridpoints => Shall the continental mask be applied?	I believe it should be counted, the land sea mask is basically an ancillary file. The output will likely have the mask in there even though it is NaN, however in an aqua planet experiement they would not be.
2018-11-14	Martin Vancoppenolle	IPSL		2.5.1 - Overview & 2.5.2 - Description => Unclear difference between what is requested for "overview" vs "description".	To be removed by ES-DOC team (RP 29-11-2018)
2018-11-14	Martin Vancoppenolle	IPSL		2.7.1 - Overview & 2.7.2 - Description => Unclear difference between what is requested for "overview" vs "description".	To be removed by ES-DOC team (RP 29-11-2018)
2018-11-14	Martin Vancoppenolle	IPSL		2.7.3 - On diagnostic variables and 2.7.4 - Missing processes => Items 2.7.3 and 2.7.4 should be grouped. Separation is meaningless or too ambiguous.	Although as you suggest these are similar keeping them separate allows for a distinction between simply variables and processes that may be useful for some (RP 2018-11-30)

2018-11-14	Martin Vancoppenolle	IPSL		2.8.6 - Corrected conserved prognostic variables => Question unclear.	Corrected (RP 2018-11-30)
2018-11-14	Martin Vancoppenolle	IPSL		3.3.3 - Scheme => I think the question is ill-posed. I would ask: what is the horizontal discretization method?	Corrected (RP 2018-11-30)
2018-11-14	Martin Vancoppenolle	IPSL		3.5.5 - Ice thickness distribution scheme => The question is very ambiguous, what is an ice thickness distribution scheme? How does that question differ from 3.5.1?	The term scheme has been removed to be clearer, this answer should be more detailed than the earlier one and is displayed as part of the model summary. (RP 2018-11-30)
2018-11-14	Martin Vancoppenolle	IPSL		4.1.2 - Overview => I don't see the point here of repeating what is being said elswhere.	Removed by ES-DOC team (RP 29-11-2018)
2018-11-14	Martin Vancoppenolle	IPSL		5.3.4 - Ice lateral melting => It is sad that there is no option for no lateral melting.	Amended (RP 2018-11-30)
2018-11-14	Martin Vancoppenolle	IPSL		5.5.1 - Salinity type => The question should be rephrased.	Unchanged. RP 2018-11-16
2018-11-14	Martin Vancoppenolle	IPSL		6.1.4 - Ice radiation transmission => The list of answers seems bizarre.	These were based on suggestions by yourself and agreed to by Alexandra Jahn. RP 2018-11-30

	Realm: Land				
Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, the responder's name, and the new version number if implementing any changes)*
Pre-stage 3	Christine Delire	CNRM	Land soil	soil map : is organic matter taken into account beside texture	Added a question on organic matter (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM		hydrology : there should be vertical discretization (like for heat treatment) and something about the coupling between heat and water	Added vertical discretization, and a question on heat/water coupling (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM		hydrology : is flooding represented ? (coupling with river processes)	Added question on flooding to river routing section (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM	Land vegetation	texture : doesn't belong here. Should only be in the soil part	Fixed (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM		water table: is it necessary if the info is already in the hydrology part	Fixed (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM		root depth instead of soil depth ? (soil depth should be in soil)	Fixed (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM	Land albedo	snow albedo already in component snow	Fixed - albedo now dealt with in each component rather than its own "process" (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM	Land carbon cycle:	there should be information on tiling or better all the tiling for all the land subcomponents should be in the key properties. Right now it only appears fo some subcomponents	Fixed (and added to nitrogren cycle) (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM	Land-use/Land cover change	required to describe how land-cover change is managed	Added to key properties (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM		required to describe how water and carbon conservation is ensured with land-cover change	Covered in key properties. David Hassell
Pre-stage 3	Christine Delire	CNRM		required to described anthropogenica carbon pool (Grand Slam protocol or else with residence/decay time)	Added to carbon cycle process (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM	land/river tracers	maybe indicated how the coupling between land processes and river routing is handled	Added to river routing process (0.2.0) David Hassell
Pre-stage 3	Christine Delire	CNRM	model name	in other mindmap model name seems to be required, it might be relevant to mention it there also	Added to key properties (0.2.0) David Hassell
Pre-stage 3	Bart vd Hurk	KNMI	Land surface	Number of levels may be different for different components (temperature, soil moisture, snow)	OK. I have removed the general vertical number_of_levels from the grid section (each component already has a question on number of vertical levels) (0.2.0) David Hassell
Pre-stage 3	Bart vd Hurk	KNMI	Land surface	Somewhere in the Land realm a proper description of the tiling procedure and use of physiography must be documented: land/sea, (dynamic) vegetation coverage, orography/roughness	Tiling in Key Properties promoted to a description (from a logical), Tiling for individual components already there (0.2.0) Daivd Hassell
Pre-stage 3	Sergey Malyshev	GFDL	1.2 Matches Atmosphere Grid	Typo in 1.2: atmpsphere -> atmosphere	Fixed (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	3.1. Basic Approximations	"Decription of the basic approximations made in the LandSurface model" sounds vague; it would be helpful if the question was made more specific.	Changed the field name to "description" with the instruction "General description of the processes modelled (e.g. dymanic vegation, prognostic albedo, etc.)" (0.2.0) Daivd Hassell
Pre-stage 3	Sergey Malyshev	GFDL	3.5 Prognostic variables	Given that "snow temperature", "snow density", etc. exist in the list of valid choices, what does non-specific "snow " mean list? Or is it just a typo?	Fixed typo (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	3.5 Prognostic variables	In 3.5: There may be other prognostic variables beside the ones listed; e.g. various biomasses; carbon can be split between soil and vegetation, etc. Is there a place to enter additional variables, if necessary?	Carbon now split between soil and vegation. you can enyer as many "other" variables as you like when entering information (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	5.1Timestepping	Not clear what "Is a time step dependent on the atmosphere coupling?" means, needs clarification.	Changed the description to "Is a time step dependent on the frequency of atmosphere coupling?" (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	7. Soil->Soil Map	Should "soil map structure" be "soil structure map"? Or is it a reference to the data structure of complex data sets? Similarly, should "soil map texture" and "soil map albedo" be "soil texture map" and "soil albedo map"?	You are right - all references updated (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	14. Vegetation	This section appears to be an exact copy of the soil section above; is it intentional?	Unintentional, and fixed (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	15.9 Stomatal resistance	"Specify the dependancies on vegetation stomatal resistance." It sounds like the question asks what quantities depend **on** stomatal resistance, but from the list of choices it appears it's the other way around: what the stomatal resistance in the model depends **on**. In particular, light is unlikely to depend on stomatal resistance, while stomatal resistance is likely to depend on ligh. Should be clarified.	Clarified (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	16.2. Number of surface temperatures used.	Not clear what this means exactly. It this a number of distinct prognostic temperatures influencing outgoing longwave radiation (i.e. radiative temperature)? Or is it the number of distinct surfaces interacting with the atmosphere? In most cases these numbers should be the same, but the question would benefit from being more specific.	Updated description: "'The maximum number of distinct surface temperatures in a grid cell (for example, each subgrid tile may have its own temperature)" (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	16.3. Evaporation	Does this refer to evaporation from soil surface, or to the entire evapotranspiration formulation? If the latter, different evaporative pathways (e. g. evap from soil and transpiration) may have different formulations.	This is from soil and vegetation. Updated do that you can choose more than one option, and improved description (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	20.3 Biomass; 20.4 Biogeography; 20.5 Stomatal Resistance.	Not clear why these three sub-sections ar in albedo section; e.g. stomatal resistance typically should have little to do with albedo. This appears to be a direct copy-paste from Section 15...	Albedo section has been removed. Albedo is now dealt with in the relevant components (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	23 Autotrophic respiration	Not clear what "Parametrized?" means in this context. Is this just asking whether this process is included or not? If it is included, it is very likely to be parametrized: it's hard to imagine full mechanistic biochemical model of plant physiology in the global GCM (yet). So perhaps just ask if it is included, leave space for more detailed description if needed?	Removed the "Parametrized?" question, retaining the questions on maintenance and growth repsiration (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL	24.2 Allocation bins	"Specify the allocation of vegetation carbon bins" -- perhaps it better expressed as "Specify distinct carbon bins used in allocation"?	Done (0.2.0) David Hassell
Pre-stage 3	Sergey Malyshev	GFDL		There should be a question asking how does model implement land use transitions. Are net or gross transitions used? Model implementing gross transitions can easily represent processes like shifting cultivation; in net transition treatment this is more difficult. This would affect carbon/nitrogen balance.	This question is now asked in key properties (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	grid>vertical	add total depth?	Added total_depth property (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	grid>vertical	need vertical for snow, lake, land ice,...	Have put a property into land_lakes, snow is already their and land ice is dealt with in the "land ice" realm (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	key properties>basic approx	I think this is both too vague and too general. Perhaps the same information could be requested at finer granularity in the tree.	Changed the field name to "description" with the instruction "General description of the processes modelled (e.g. dymanic vegation, prognostic albedo, etc.)" Further questions are in each process (0.2.0) Daivd Hassell
Pre-stage 3	Chris Milly	GFDL	key props>landatm flux exch	Not clear what info belongs here. Is it just binary yes/no this quantity is or is not exxchanged?	These is a list of fluxes from which you can choose as many or as few as you need. David Hassell
Pre-stage 3	Chris Milly	GFDL	key props>atm coupling	There might be different answers for different entities (e.g., vapor flux vs dust flux)	Changed this question to "Describe the treatment of land surface coupling with the Atmosphere model component, which may be different for different quantities (e.g. dust: semi-implicit, water vapour: explicit)", which has a free text answer (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	key props>prog vars	Wha is "snow" as distinct from other snow variables?	This was a typo - now removed (0.2.0) David Hassell

Pre-stage 3	Chris Milly	GFDL	key props>prog vars	It might be better to create another level in the hierarchy here, to differentiate soil, snow, lake, river, land ice,vegetation. Then, each of these would (potentially) have prog vars for water/ice mass, T/heat content, carbon, N, P...	Moved questions on prognostic variables to individual processes (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	key props>prog vars	missing lake temperature or heat content, lake depth, lake ice content, etc.	These questions are asked in the land_lakes process. David Hassell
Pre-stage 3	Chris Milly	GFDL	key props>prog vars	missing river volume, temperature or heat content, ice volume...	Questions asked as free text in river routing process (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	key props>prog vars	many of these are unlikely to be prog, but rather diagnostic, e.g., skin temperature(s?), river discharge	Questions on prognostic variables asked as free text in individual processes (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	key props>tiling	more detail would be appropriate. static vs dynamic, prescribed vs predicted, types of disturbances (fire, harvest, etc.)	Tiling in Key Properties promoted to a description (from a logical), Tiling for individual components already there (0.2.0) Daivd Hassell
Pre-stage 3	Chris Milly	GFDL	key props>cons props	energy appears twice	Fixed (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	key props>cons props	descriptions are vague. could we say such and such is conserved globally to within X [units]/year?	Added the suggested descriptions (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	key props>time steps	No distinction is allowed here for multiple time step levels, e.g., soil physics, river physics, vegetation growth, disturbances...	I have updated th overall timestep description and added the possibilty of providing timesteps for individual subprocesses (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	soil>map>water table	I presume most models will predict water table depth, not use an input map.	Map descriptions are now optional. Can say if water table is prognostic, or not, in the general "what the prognostic variables" question (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	soil>map>depth	More flexibility advised here. Some models will not have a specific soil depth but rather a continuous representation of property variations with depth.	Added "continuously_varying_soil_depth" question (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	soil>hydrology>description	This entry is vage. What are soil hydrological properties? Would this belong over with texture, structure etc?	I have re-described this as "General description of the soil hydrological model" (0.2.0) Daivd Hassell
Pre-stage 3	Chris Milly	GFDL	soil>hydrology> GW layers	Some models do not have separate soil and GW modules, but rather represent these continuously in the vertical, with layers potential switching from saturation to non-saturation.	I have changed the questions on how many soil/GW layers. I'm not sure if this addresses the comment, so more feedback would be appreciated. (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	soil>hydrology>water storage method	I can't guess what a water storage method is.	I have renamed this "hydrological method " (the hydrological dynamics scheme in the land surface model) (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	soil>hydrology>freezing	I think most models will have number of ground ice layers being a dynamics subset of number of soil layers, not worthy of distinguishing here. Likewise, permafrost will likely be dynamically computed within the soil module. What is an "ice storage method?"	I have changed the description to "How many soil layers may contain ground ice". I have left the question, and that on permafrost, where it is because it is still in the "soil" process, but and am not sure that it is any better in the "heat treatment" sub-process. (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	soil>hydrology>drainage/runoff	Combine these two. "Gravity drainage" could be one option for runoff. There are several other options that could be included. Maybe "topmodel-based." Horton mechanism. Dunne mechanism. Lateral subsurface flow. Baseflow from groundwater.	Merged runoff into drainge and added a list of the types you suggest (from which you can select as many or as few as apply) (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	soil>hydrology	Add lateral connectivity between tiles, which could be (a) perfect connectivity (i.e., common soil for multiple veg tiles), (b) Darcian flow among hillslope tiles, ...?	I have added a question on lateral connectivity, including the options you suggest (you can always add any other, unspecified options to these predefined lists) (0.2.0) David Hassell
Pre-stage 3	Chris Milly	GFDL	LAND general	I don't have time to go through the whole realm in detail. General comment is that the overall hierarchy is not perfect, and I've commented specifically on this at points. Also, there are lots of redundancies, where the same information could be contained in different places in the hierarchy. It looks a bit like it was designed by just adding together lots of suggestions, without much thought about how the different pieces are related. Admittedly, this would require subject-matter expert time, which is in short supply...	This is a welcome comment. I hope that by addressing the various comments here I have improved the hierarchy and at least reduced the redundancies. I shall review the whole realm again now that I have thought about all of the excellent additions given here. David Hassell
Pre-stage 3	Eric Guilyardi	IPSL	short table	I would add the model name (top of key properties)	Added (0.3.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Land Atmosphere Flux	over land, physical and biogeochemical fluxes are all lumped into one, including river routing. For ocean, however, the physical and biogeochemical stuff is kept separate. Why?	I believe that the separation between realsm follows the CMIP6 scheme (https://github.com/WCRP-CMIP/CMIP6_CVs/blob/master/CMIP6_realm.json), which has much history behind it! David Hassell
Pre-stage 3	John Scinocca	CCCma	all	It is not always clear what is being requested in some boxes. For example, under "Land Atmosphere Flux Exchanges" what does " Enum Is Open ?" mean? As a general comment, some examples beside each requested field would be very helpful.	We are in the process of updating the descriptions to aviod such technical jargon. David Hassell
2019-06-24	Marie-Pierre Moine	CERFACS	River routing	When defining the Source and Target of a coupling, we are limited to a choice among the 8 realms. However, this does not necessarily matches the reality of the coupling. For instance, there is no "river routing" realm in our climate model, land-surface and river-routing model components exchange coupling fields.	The river routing process has a property for describing the coupling to land ("coupled_to_land"). David Hassell
2019-06-24	Marie-Pierre Moine	CERFACS	Carbon cycle	What is excepted is sometime unclear. For example, in 7.3.1.3 "Decomposition: List the decomposition methods" we do not really understand what "methods" means.	
2019-06-24	Marie-Pierre Moine	CERFACS	Key Properties	A typo in: "1.2.1 Key Properties --> Conservation Properties / Convservation"	Fixed (**1.1.1**) David Hassell
				7.1.1.4 * Time Step INTEGER Time step of carbon cycle in seconds: in our land model, we use 2 different time steps, one for photosynthesis, respiration and turn over and an other one for carbon allocated to plant organs. However there is only place for one time step.	time_step : 'Time step of carbon cycle in seconds. Specify if there is a single time step for the whole scheme.'; time_step_photosynthesis_respiration_turn_over : 'Time step of photosynthesis, respiration and turn over in seconds'; time_step_carbon_allocated_to_plant_organs : 'Time step of carbon allocated to plant organs in seconds'. Fixed (**1.1.2**) David Hassell

Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, the responder's name, and the new version number if implementing any changes)*
	Realm: Land Ice				
2017-11-21	Christian Rodehacke	Danish Meteorological Institute	Dynamics > Timestep	If the ice sheet/ice shelf model uses an adaptive time scheme, what time step of the ice scheme shall we report for "Dynamics > Timestep"; longest, shortest, mean?	Added a question on the presence of an adaptive time scheme, and if there is one then any reasonable, representative timestep may be reported (0.5.0) David Hassell
2017-11-21	Christian Rodehacke	Danish Meteorological Institute	Model Name	Shall we also include the version number/ID for publicly available code?	Added questions on repository, code version and code languages in key properties (0.5.0) David Hassell
2017-11-21	Christian Rodehacke	Danish Meteorological Institute	General question	If a surface mass balance model is used as a chain element between a coupled climate model and an ice sheet model, what shall be report?	Added question ice -> mass_balance -> surface_mass_balance question (0.5.0) David Hassell

	Realm: Aerosol				
Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, the responder's name, and the new version number if implementing any changes)*
pre-stage 3	Øyvind Seland	MET Norway	Aerosol	several methods allowed because the different species. I presume that this term that is found several places means that you ist up individual species on the right as applicable	Yes - description updated to reflect this. (**0.2.0**) David Hassell
2019-06-24	Marie-Pierre Moine	CERFACS	Aerosol	Typographical mistakes: "convention" -> "convection"; "Absortion" -> "Absorption"	Fixed (**1.0.3**) David Hassell
2019-06-24	Marie-Pierre Moine	CERFACS	Aerosol	This document implies that the aerosol model depends on the chemistry model (because the proposition "uses atmospheric chemistry xx" is often shown), which is not the case for all models. Instead of that, it would have been better to have "uses atmospheric physics xx", which could be more useful for CMIP6 models.	Kept the Atmospheric Chemistry antrie, but added "Uses atmospheric dynamics transport scheme" or "Uses atmospheric physics turbulence scheme" as appropriate (**1.0.4**) David Hassell
2019-06-24	Marie-Pierre Moine	CERFACS	Aerosol	The order of the questions and the asterisks which indicate the non-optional/optional items are sometimes surprising (for example, questions with asterisks are often after questions without, important questions in 7.model such as the type of aerosol scheme (bin/modal) are only asked at the end, etc.)	
2019-06-24	Marie-Pierre Moine	CERFACS	Aerosol	The aerosol pages of ES-DOC are not very easy to understand (for example we wonder what is asked in "Commonly used name for the model in aerosol model" ??), and some documentation would be appreciated in general	This is confusing, and will be changed to read "Commonly used name for the aerosol model"
2019-06-24	Marie-Pierre Moine	CERFACS	Aerosol	There are some redundancies between the different sheets (for example concerning the grid, the number of wavelengths in the longwave radiative code, the emissions, ...)	Grid duplication removed. https://github.com/ES-DOC-INSTITUTIONAL/cnrm-cerfacs/issues/4#issuecomment-504969952 https://github.com/ES-DOC-INSTITUTIONAL/cnrm-cerfacs/issues/4#issuecomment-504974174

	Realm: Ocean Bio Geo Chemsitry				
Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, the responder's name, and the new version number if implementing any changes)*
Pre-stage 3	Roland Séférian	CNRM	model family	unclear if this refers to model complexity (relate to marine biology) or internal structure e.g., Monod, Quota...	Change to "model type" and enum provided [EG 8/11/17]
Pre-stage 3			basic assumption	unclear whether this refers to mass conservation of some tracers or to the assumtions in terms of redfield ratio. It might be redundant with "model family" in someways when considering Redfieldian and non-Redfieldian model...	Modified to be "elemental stoichiometry" [EG 8/11/17]
Pre-stage 3	John Dunne	GFDL	Gas Exchange	I see entries for CO - Carbon monoxide - which I am not certain any groups are modeling, but I do not see entries for CFC11, CFC12, SF6, 13CO2 and 14CO2 which many groups are modeling except to be input as "other gases"	CO removed and 5 others added [EG 8/11/17]
Pre-stage 3	John Dunne	GFDL	Tracers	I do not see a way to enter whether the model is calcualting "natural", "abiotic" and isotopic "13C", "14C" carbon cycles which will be part of OMIP. This might be helpful to ad as only some models will be able to implement these	Section on "DIC and alcalinity" added in tracers [EG 8/11/17]
Pre-stage 3	John Dunne	GFDL	Key Properties	I find the example in parentheses for 'Name of ocean biogeochemistry model code (PISCES 2.0,...)' to be extremely helpful. It would be great if the other questions also gave examples... I'm not sure what the scope of anser is requested for 'Model Family' for example.	More details given - see above comment 1
2017-12-18	Jerry Tjiputra	MET Norway	Key Properties	In the Ocean biogeochemistry table (https://view-specializations.es-doc.org/?target=cmip6.ocnbgchem&client=esdoc-url-rewrite), it is not clear to me what is meant by 'Damping' tracer (i.e., describe any tracer damping used)? Would be good to have this clarified.	Help text clarified [v 0.5.0]
2018-02-09	Andrew Yool	NOC	Key Properties	Topic Property asks for: List of all diagnotic tracer variables in the ocean biogeochemistry component. Question: Not 100% what these are; would DIP count?; we don't have phosphate in the model, but in the CMIP6 diagnostics we do produce it by dividing nitrogen numbers by 16 (this approach is sanctioned by OMIP). Need better clarification on what should be included under this topic.	Help text clarified [v 1.0.0]
2018-02-09	Andrew Yool	NOC	Ecosytem	Topic Property asks: Definition of upper trophic level (e.g. based on size) ? Question: Need better clarification on what should be included under this topic.	Help text clarfied [v 1.0.0]
2018-02-09	Andrew Yool	NOC	Ecosystem	Topic Property asks: Define how upper trophic level are treated Question: Need better clarification on what should be included under this topic.	Help text clarfied [v 1.0.0]
2018-02-09	Andrew Yool	NOC	Particules	Topic Property asks: How is particulate carbon represented in ocean biogeochemistry? This is an enum 1.1. Question: This section requires the model to be one of two things whereas our model does both - Diagnostic and Diagnostic Ballast. Can enum be changed to 1.N?	Cardinality changed to 1.N [v 1.0.0]

	Realm: Atmospheric Chemistry				
Date	Reviewer's Name	Reviewer's Institution	Component	Comment	ES-DOC Response *(include the date, the responder's name, and the new version number if implementing any changes)*
Pre-stage 3	John Scinocca	CCCma	Atmoschem	Does the question 'Number of tracers in atmospheric chemistry model' refer to the number of advected tracers?	Yes. Updated description to make this clear. (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	Is 'atmospheric chemistry calculations generalized into families of species?' specifically referring to the use of families for advection?	I believe that it is not referring to advection, rather the chemical dynamics. I shall update the description to make this clear. (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	Are the questions 'Timestep for physics and chemistry (in seconds).' and 'Timestep for the atmospheric chemistry model (in seconds)' redundant or are they requesting information on different aspects? Do the physics and chemistry necessarily have the same timestep, as implied in the first question?	I have separated these into two questions - one for physics one for chemistry. We now have timestep questions on advection , physic, chemistry and the integrated atmos chem timestep. (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	For the questions on 'Split Operator Order' is there a syntax for use if two of these processes are included in the same calculation? For example, we calculate emissions as part of chemistry and would assigning both of these operators the same number be understood correctly?	Yes - that would be fine. The descriptions have been updated to make this clear. (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	Should the request 'Split Operator Order' for 'Call order for heterogeneous phase chemistry scheme' specify 'tropospheric heterogeneous chemistry'?	We can specify tropospheric, and also have a similar question for stratospheric, for consistency (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	The three questions on 'Meteorological Forcings' seem more applicable for chemical transport models. For a model with on-line chemistry the question is confusing, particularly the question on which 2D and 3D forcing variables are used.	These questions have been removed (in line with the simplification of the "transport" process). (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	Under 'Method used to ensure mass conservation' there are entries for 'Concentration positivity' and 'Gradient monotonicity'. These two are, strictly speaking, not sufficient to ensure mass conservation. I would suggest a first question on whether there is a mass conservation check required. Then a follow-on question of, if yes how is the correction distributed spatially.	The whole "transport" process has been replaced with the questions "is transport handled by the atmosphere scheme" and "if not, describe it (in free text)". (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	Under the question 'Method used to define chemical species emitted at the surface' is the choice 'Prescribe[d] (spatially uniform)' meant to refer to a prescribed spatially uniform mixing ratio?	Replaced 'Prescribe[d] (spatially uniform)' with two options: 'spatially uniform mixing ratio' and 'spatially uniform concentration (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	The 'Method used to define the chemical species emitted in the atmosphere' could be more clear that the question applies to sources that emit directly into model layers above the surface.	Changed the description to "Methods used to define chemical species emitted directly into model layers above the surface (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	The question 'The number of steady state species in the gas phase chemistry scheme.' seems to me a bit unclear. I think the reference is to species that are assumed to adjust quickly and are therefore not advected – like the hydroxyl radical for example. But the question could also refer to the number of chemical species that are solved numerically assuming photochemical steady state?	Updated the description of this property to "The number of gas phase species for which the concentration is updated in the chemical solver assuming photochemical steady state" (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	Is the question 'The number of advected species in the stratospheric heterogeneous chemistry scheme.' specifically referring to solid or liquid phase (aerosol) constituents?	This question has been removed as it it advection is not part of this process (0.2.0) David Hassell
Pre-stage 3	John Scinocca	CCCma	Atmoschem	The question 'Reaction information taken into account by the photolysis scheme.' seems unclear. Perhaps 'Environmental conditions taken into account by the photolysis scheme'? I am guessing the question is whether pressure- and temperature-sensitive cross-sections and quantum yields in the photolysis calculations are modified to reflect the modelled conditions.	It was indeed unclear. Your suggestion has been incorporated (0.2.0) David Hassell