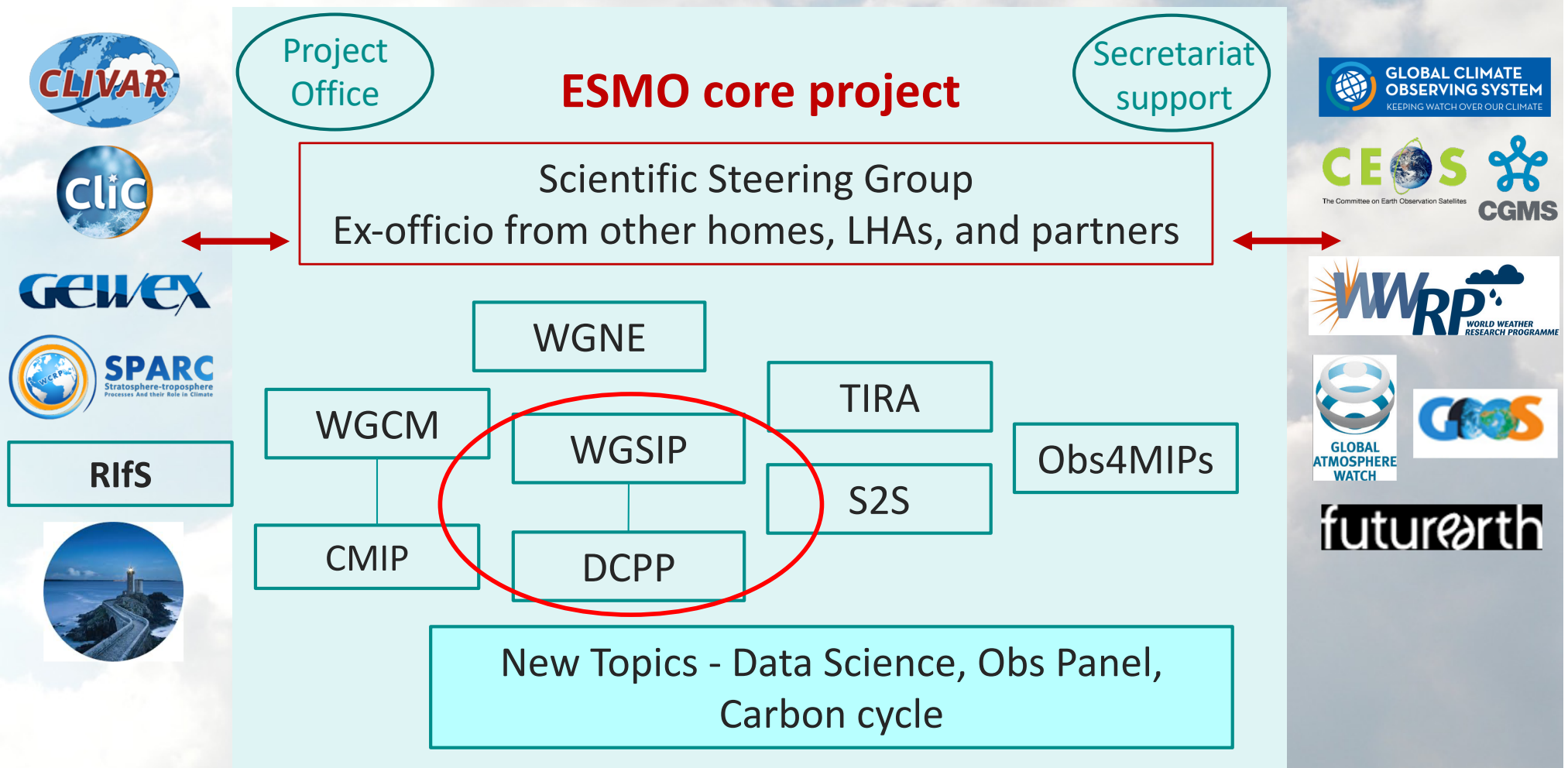


ESMO: Initial Structure



Broader stakeholders like UNFCCC, IPCC, GFCS (C3S), IOC-UNESCO, ISC, WMO, NMHSs, Regional Climate Centres, etc.

ESMO governance

- Interim SSG will be replaced by SSG that is independent of ESMO groups
- WGSIP will report to ESMO SSG instead of WCRP JSC
- This includes approval of proposed membership changes
- This structure is similar to other WCRP core projects e.g. CLIVAR
- *Group memberships including WGSIP will be 'frozen' in 2022*

ESMO Science Questions

To be formulated by ESMO interim SSG

1. What are the WCRP observational requirements and best practices to derive these requirements?
2. What are the systematic errors in observation data and observation systems
3. What is the future of climate modelling?
4. What are the sources and magnitude of systematic errors across time and space scales in Earth System models?
5. How can we use variational methods, including data assimilation and sensitivity analysis, across timescales and in coupled systems?
6. What are the current and future changes in the Carbon Cycle?

WCRP Lighthouse Activities

Explaining and
Predicting Earth
System Change

My Climate
Risk

Digital Earths

Safe Landing
Climates

WCRP
Academy

WCRP Lighthouse Activities are the major and new scientific approaches, technologies, and institutional frameworks – required to meet society’s need for robust and actionable climate information

<https://www.wcrp-climate.org/lha-overview>

Explaining and Predicting Earth System Change

To design, and take major steps toward delivery of, an integrated capability for quantitative observation, explanation, early warning and prediction of Earth System Change on global and regional scales, with a focus on multi-annual to decadal timescales.

- June-Yi to report
- EPESC science plan authors include June-Yi, Anca Brookshaw (ECMWF/C3S), Masahide Kimoto (National Institute for Environmental Studies, Japan), James Risbey (CSIRO), Doug Smith (UK Met Office), Frédéric Vitart (ECMWF/S2S),

My Climate Risk

To develop a new framework for assessing and explaining regional climate risk to deliver climate information that is meaningful at the local scale.

- ‘bottom-up’ approach to regional climate risk*, which starts from the decision context
- ...key to this is process understanding of the variability/change of regional climate and climate extremes on targeted timescales, within a particular local context
- *Science required* includes (selected from science plan):
 - climate information distillation, including the analysis of hierarchies of model ensembles...region- and purpose-specific model selection
 - understanding of model biases, uncertainties, etc., and how much we can sensibly say about climate risks for distinct regions/sectors/stakeholders
 - possibilities of low likelihood high impact changes/events
 - better understanding of the role of teleconnections/climate phenomena as a driver for regional scale climate variability and change
 - better understanding of...risks from ocean extremes, working in the context of the UN Ocean Decade

* ‘risk’ = combination of hazard, vulnerability and exposure

Digital Earths

To develop a digital and dynamic representation of the Earth system, optimally blending models and observations, to enable an exploration of past, present and possible futures of the Earth system.

- Developed through national and international consortia, such as the Destination Earth consortium in Europe
- Major areas of activity:
 - global coupled ultra-high-resolution modelling
 - **data assimilation for climate***: establish an active research community in data that builds on the existing NWP and re-analysis efforts and significantly expands them
 - regional Digital Earths systems
 - advanced digital technology
- “...revolutionary prediction/projection capabilities of Digital Earths will support Objectives 2 and 3 through much advanced prediction systems based on high-resolution ensembles, the integration of climate and Earth-system components...”
- S2S, Seasonal and Decadal prediction groups need to be involved at an early stage
- **proposes foundational workshop on Data Assimilation for Climate as first step**

* including for example climate-critical fundamental constraints such as energy or water conservation

WCRP Academy

To determine the requirements for climate research education and to build enabling mechanisms. The Academy will work with WCRP core activities and established climate education providers, including universities, to achieve this.

- Mission is to equip current and future climate scientists with the knowledge, skills and attributes required to tackle the world's most pressing and challenging climate research questions
- Will promote and advance lifelong learning opportunities and global equity in climate science training
- Hub for climate science training opportunities that connects people who need climate science training with people and institutions that can provide that training
- **Climate Training Stocktake Survey** underway until 26 Nov 2021:
<https://www.surveymonkey.com/r/PY9WHV2>

Safe Landing Climates

To explore the routes to climate-safe landing 'spaces' for human and natural systems, on multi-decadal to millennial timescales; connecting climate, Earth system and socio-economic sciences. Explore present-to-future "pathways" for achievement of key SDGs.