Historically

Weather prediction

- High resolution atmosphere model only
- Persisted SSTs, sea-ice..
- climatological aerosols, ozone....
- Strong focus on atmosphere initialization
- Use of observations for data assimilation and verification

Climate prediction

- Lower resolution of the atmospheric model
- More complete earth system model (ocean, sea ice, chemistry…)

More recently..

The differences between weather and climate modelling are getting smaller.

- Climate models tested in NWP mode (transpose AMIP). Increased interest for “weather within climate”

- Some NWP models are getting coupled to ocean, sea-ice models. Chemistry.

Towards seamless weather and climate predictions

Topics we might discuss:

- What does “seamless weather and climate prediction” mean? How much seamless weather and climate forecasting systems could be?

- What can be achieved in the next 5-10 years?

- What would the WCRP community gain from seamless prediction?

- Is there a contradiction between efforts towards seamless predictions and increased complexity in Earth System Modelling?

- Can WCRP advance on all fronts (seamless, high resolution, ESMs, time scales, etc), especially under budget limitations?

- What concrete steps can be made to bring WCRP and WWRP communities together for more seamless prediction.

Towards seamless weather and climate predictions

Topics discussed:

1) ***What does "seamless weather and climate prediction" mean? How much seamless weather and climate forecasting systems could be?***

- There are different views on how seamless weather and prediction forecasts should be. General consensus is that "seamless" should be a philosophy rather than a mantra. Some processes are specific to forecast time range.

- The forecast information from weather to seasonal forecasts is currently not seamlessly provided by different forecast systems to users

- The fact that NWP models change frequently makes it difficult for hindcast testing at longer time ranges.

Towards seamless weather and climate predictions

Topics discussed:

2) What can be achieved in the next 5-10 years?

- The problem of re-forecast testing needs to be solved. Smarter, more cost effective ways of testing reforecasts should be possible.
- Coupled data assimilation should deliver improvement in forecast skill across time scales.
- Improve the infrastructure and standards (e.g. grib, netcdf) for a better alignement between WWRP and WCRP communities.
- Scale aware physics (e.g. convection in grey zone)
- Push for coupled ocean-atmosphere modelling for NWP

Towards seamless weather and climate predictions

Topics discussed:

3) ***What would the WCRP community gain from seamless prediction?***

- Better confidence in climate change evaluation by testing forecasts in short range
- Gain from different cultural mindsets between WWRP and WCRP
- Allows to run transpose-AMIP type of experiments, although these experiments can be affected by the lack of data assimilation system for some models.
- Better understanding of systematic errors

Towards seamless weather and climate predictions

Topics discussed:

4) Is there a contradiction between efforts towards seamless predictions and increased complexity in Earth System Modelling?

- Not necessarily. Seamless systems can be a single system but with the same components of the Earth system switched on when necessary.
- Working seamlessly could help more efficient implementation of new ESM components,
- Can help prioritize the efforts: is complexity as valuable as increased resolution?

Towards seamless weather and climate predictions

Topics discussed:

5) Can WCRP advance on all fronts (seamless, high resolution, ESMs, time scales, etc), especially under budget limitations?

- Seamless would be a way to encourage WWRP and WRP communities to work together on common issues

- Importance of seamless approach between research and operations and end users

Towards seamless weather and climate predictions

Topics discussed:

6) **What concrete steps can be made to bring WCRP and WWRP communities together for more seamless prediction.**

- Re-structure WCRP and WWRP to have more common groups (e.g. modeling core, data assimilation, verification …)
- Better use of transpose AMIP (transpose C-MIP?)
- ExaScale computing represents a big opportunity and challenge for bringing the Weather and Climate community together, because of the level of complexity required