WCRP activities on Decadal Climate Prediction

G. Boer, Y. Kushnir, A. Scaife, D. Smith with the WCRP Grand Challenge on Near-Term Climate Prediction, the WCRP Decadal Climate Prediction Project, and other WCRP initiatives

Supporting Climate Services

Refined science and operational standards on decadal prediction are required to enable fully seamless climate information, as recommended by the Global Framework for Climate Services (GFCS).

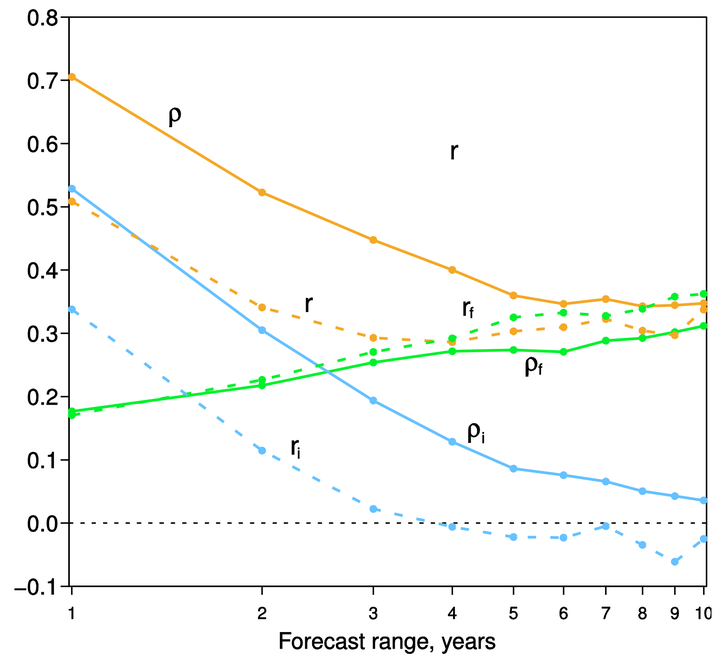
WCRP activities on decadal climate prediction aim for:

- **ongoing production of decadal climate predictions** (experimental, quasi-operational) in support of societal needs
- **operational standards, methods and guidance** for routine decadal predictions, in close collaboration with activities on operational decadal prediction by WMO.

Science Background and Goals

Decadal climate modeling and predictions require:

I. current and projected anthropogenic forcing (as in CMIP runs)
II. starting from the present, observed state of the coupled system



Orange lines: Evolution with forecast range of global average of potential (solid) and actual (dashed) correlation skill for annual mean temperature. Green and blue lines: estimated contributions from prediction of externally forced and internally generated components, respectively.

Boer, Kharin and Merryfield (2013): Decadal predictability and forecast skill. Clim Dyn, 41.

Opportunities for Contributions to UNFCCC and IPCC Processes

The decadal prediction science community can contribute to

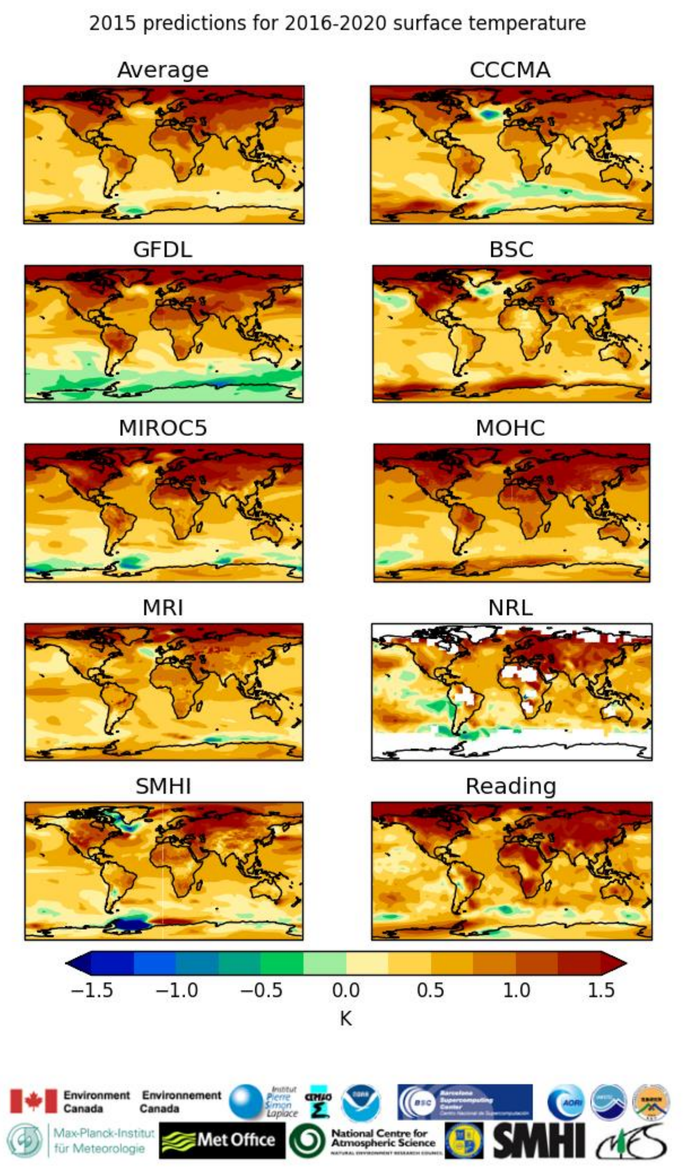
- IPCC Assessments and Special Reports: Foreseen contribution to the upcoming SR on Global Warming of 1.5 °C
- Global Stocktake activities under the Paris Agreement: WCRP is working with its entire science community (within and beyond decadal climate predictions) to compile and jointly present WCRP-wide options for taking stock through “the best available science”

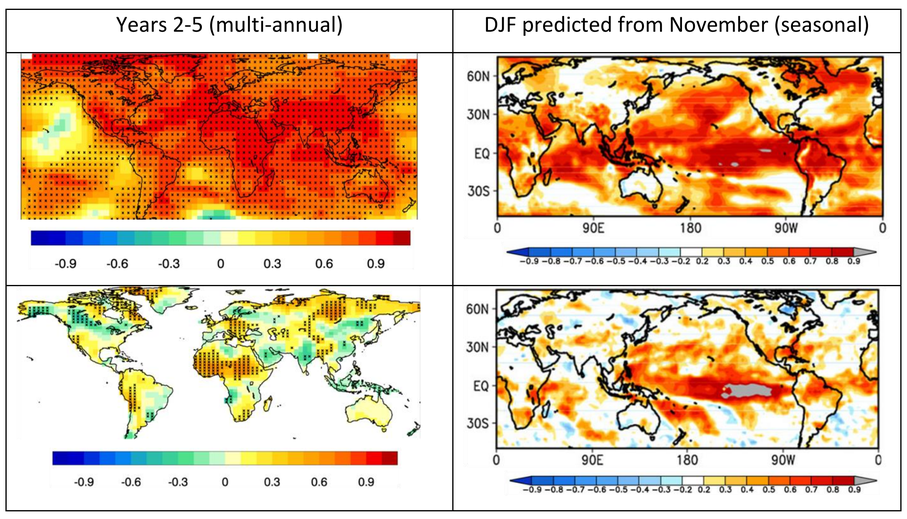
WCRP Research Topics

Within WCRP, the Grand Challenge on Near-Term Climate Prediction (GC-NTCP), the Decadal Climate Prediction Project (DCPP), and other initiatives address:

- Extensive coordinated hindcast studies, both within and complementary to CMIP6
- Mechanisms governing decadal variability and predictability, including targeted case studies
- Modeling aspects: initialization and ensemble generation; shock, drift and bias; data assimilation
- The science of the application of decadal predictions

From Research to Operations





Top: Top left: Correlation skill for year 2-5 average near-surface temperature from Met Office DePreSys (ensemble mean), from hindcasts started annually 1960-2005. Top right: correlation score for Nov. predictions (ensemble mean) of DJF temperature from a WMO GPC over 1982-2010. Bottom row, as top but for precipitation. Stippling on left-hand plots indicates skill significant at 95% level.

Left: Decadal forecast exchange 2015 predictions for years 1 to 5 surface air temperature. UK Met Office’s informal multi-model decadal forecast exchange, http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/long-range/decadal-multimodel

Strong Partnerships for Science and Operations

Links are well-established with the WMO CBS/CCl Inter-Programme Expert Team (IPET-OPSLS), GFCS and other relevant activities by WMO, WCRP and the global science community.

WCRP World Climate Research Programme