

A Summary Report of WGSIP Activities

12 June 2012

Recent WGSIP Related Activities

- **14th WGSIP session, 12-14 September, 2011, ICTP, Trieste. Joint with “Quantifying Weather and Climate Impacts (QWeCI)**
- **15th WGSIP session, 24-26 September, 2012, Hamburg, Germany. Joint with WCRP/WGCM**
- **WGSIP to report WCRP JSC**

Response to CLIVAR SSG Questions

- **Contributions to developing CLIVAR science and fit, where appropriate, to the CLIVAR imperatives**
 - **WGSIP uses current ocean observations and climate models of Ocean-Atmosphere coupling to produce regional climate predictions from intraseasonal, seasonal, and decadal time scales**

Response to CLIVAR SSG Questions

- Briefly list any specific areas of your panel's activities that you think would contribute to the WCRP Grand Challenges as identified by the JSC at its most recent meeting
 - Challenge 1 (**Provision of skillful future climate information on regional scales**): The CHFP (Climate-system Historical Forecast Project) will give a state of the art measure of the skill of regional climate predictions out to months ahead
 - Challenge 3 (**Cryosphere response to climate change**) : Several seasonal forecast centres (e.g. UKMO, CCCMA, NCEP) now make real time seasonal to decadal forecasts with initialized sea ice; Sea-Ice HFP

Response to CLIVAR SSG Questions

- Briefly list any specific areas of your panel's activities that you think would contribute to the WCRP Grand Challenges as identified by the JSC at its most recent meeting
 - Challenge 5 (**Past and future changes in water availability**): Seasonal and decadal predictions naturally output the full range of climatic variables. These forecasts form the basis for future climate services in water availability out to years ahead.
 - Challenge 6 (**Science underpinning the prediction and attribution of extreme events**): Prediction of extreme events is at the core of the seasonal to decadal prediction effort.

Response to CLIVAR SSG Questions

- Key science questions that you anticipate your community would want to tackle in the next 5-10 years within the context of a more ocean-atmosphere orientated CLIVAR
 - Q1: To what extent **ocean-atmosphere, sea ice-atmosphere, land-atmosphere coupling** drive predictable year to year changes in extratropical atmospheric circulation and hence extreme events?
 - Q2: How do current ocean model errors affect the skill of predictions months to years ahead?
 - Q3: What are the key climate model changes needed to best represent the processes in Q1 and to minimize the errors in Q2 to improve seasonal to decadal forecast systems?

WGSIP Foci

- **Sub-Seasonal**
- Seasonal
- Decadal
- Links to other activities

Sub-Seasonal

- **WWRP-WCRP “Sub-Seasonal to Seasonal Prediction” Project**
 - Initial meeting: 1-3 December, 2010, Met Office, Exeter UK
 - Kick off meeting of the planning group, 2-3 December, 2011, WMO, Geneva
 - **Several WGSIP members attended both meetings**
- **Implementation plan has been presented to the WWRP/JSC, and will be presented to the WCRP/JSC**

WWRP – WCRP Sub-Seasonal to Seasonal Prediction Project

- **The concept**
 - Build an archive of data from monthly forecast systems from different operational center along the lines of THORPEX/TIGGE
- **Data archive will enable us to address various research and modeling issues**
 - **Research**
 - Predictability & predictability limits; sources of predictability (MJO; stratospheric processes...)
 - **Practical**
 - Initialization; resolution; role of coupling; ensemble generation; verification;...

Outline

- Sub-Seasonal
- **Seasonal**
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Seasonal

- **Climate-system Historical Forecast Project (CHFP): To quantify sources of predictability on seasonal time-scale**
 - Exchange of seasonal forecast data (CHFP)
 - **Stratospheric - HFP**
 - Impact of stratosphere on tropospheric variability and prediction
 - **Sea Ice – HFP**
 - Case studies with and without initialization of sea ice
 - **GLACE -2**
 - Influence of land initial conditions on seasonal predictions and predictability

Seasonal

- National Multi-Model Ensemble (NMME)**

Model	Hindcast Period	Ensemble Size	Lead Times	Arrangement of Ensemble Members	Contact and reference
CFSv1	1981-2009	15	0-8 Months	1 st 0Z +/-2 days, 21 st 0Z +/-2d, 11 th 0Z+/- 2d	Saha (Saha et al. 2006)
CFSv2	1982-2009	24(28)	0-9 Months	4 members (0,6,12,18Z) every 5 th day	Saha (Saha et al. 2010)
GFDL-CM2.2	1982-2010	10	0-11 Months	All 1 st of the month 0Z	Rosati (Zhang et al. 2007)
IRI-ECHAM4-f	1982-2010	12	0-7 Months	All 1 st of the month 0Z	DeWitt (DeWitt 2005)
IRI-ECHAM4-a	1982-2010	12	0-7 Months	All 1 st of the Month 0Z	DeWitt (Dewitt 2005)
CCSM3.0	1982-2010	6	0-11 Months	All 1 st of the Month 0Z	Kirtman (Kirtman and Min 2009)
GEOS5	1981-2010	6	0-9 Months	1 Member every 5 th day	Schubert (Vernieres et al. 2011)

<http://iridl.ldeo.columbia.edu/SOURCES/.Models/.NMME/>

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Decadal

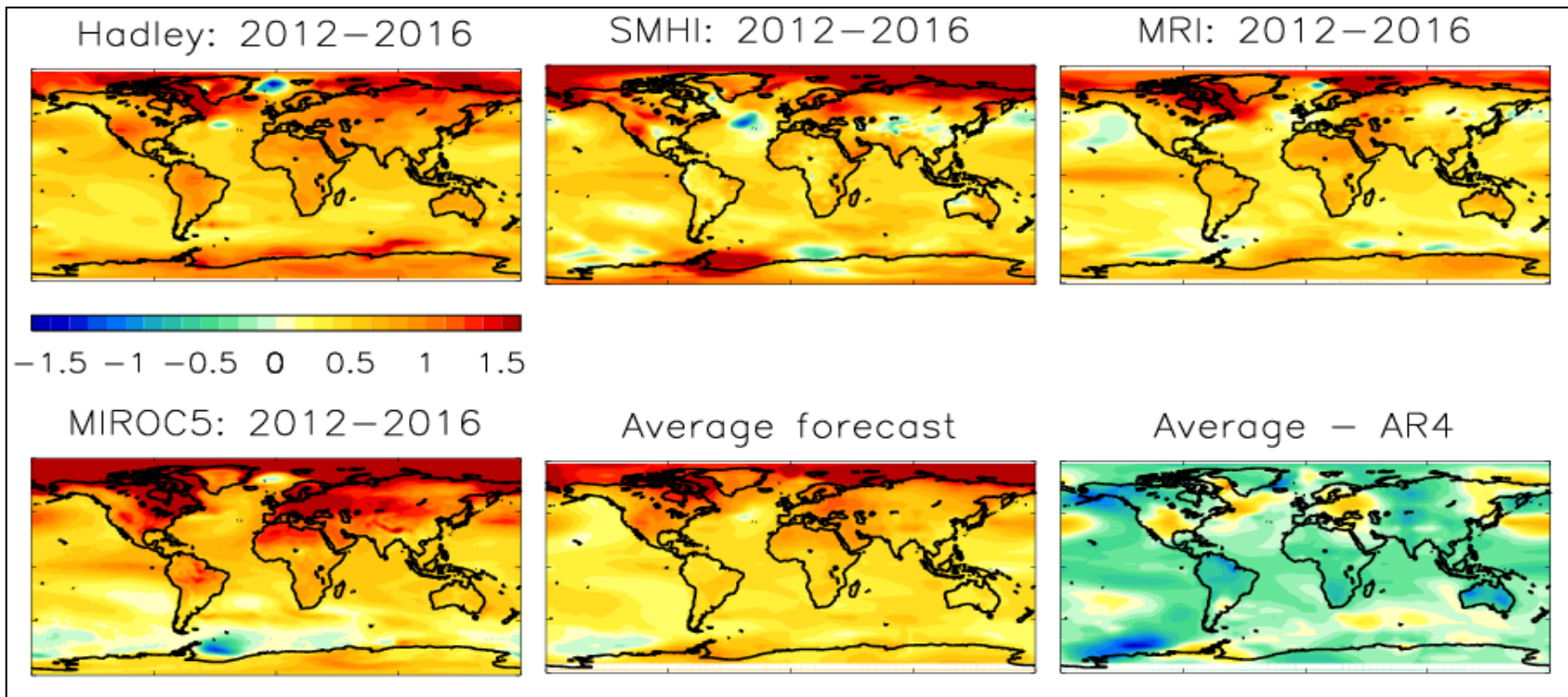
- **CMIP5 decadal prediction runs are coming online**
- **Earth System Grid (ESG) – Data from 14 models**
 - HadCM3; CanCM4; MRI-CGCM3; MIROC5 (2);
 - IPSL; CNRM; MPI; BCC; NCEP; GFDL;
 - FGOAL; EC-EARTH; GEOS-5
- **Analysis of skill of decadal predictions using CMIP5 archive**

Decadal

- **Recent papers (currently under review)**
 - **Goddard et al., 2012: A Verification Framework for Interannual-to-Decadal Predictions Experiments.** *Climate Dynamics.*
 - **Meehl et al., 2012: Decadal Climate Prediction: An Update from the Trenches.** *Bull. Amer. Meteor. Soc.*

Decadal

- **Experimental real-time ongoing decadal predictions based on once a year exchange of data (organized by Doug Smith)**



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Links to Other Activities

- **Climate of 20th Century (C20C)**
- **WMO lead center for long-range forecasts multi-model ensemble (LC-LRFMME);**
[/http://wmoic.org/](http://wmoic.org/)
- **Global Framework for Climate Services (GFCS)**