WGSIP/DCPP

Project achievements and future plans

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WGSIP co-chairs
WCRP Working Groups

- Working Group on Coupled Modelling (WGCM)
- Working Group on Sub-seasonal to Interdecadal Prediction (WGSIP)
- Working Group on Numerical Experimentation (WGNE)

- Weather predictions
- Subseasonal to decadal predictions
- Long term climate change projections

- day, week, month, season, year, decade, century
Current WGSIP Projects

• **SNOWGLACE**
  - study impacts of snow initialization on forecast skill
  - 8 participating centers
  - poster in session A5

• **Long-Range Forecast Transient Intercomparison Project**
  - intercompare shocks/drifts in archived hindcast climatologies
  - 6 subseasonal, 19 seasonal, 15 decadal prediction models
  - two posters in session C1

• **Teleconnections**
  - role of tropical rainfall in driving teleconnections to extratropics
  - multi-model skill in predicting seasonal tropical rainfall anomalies

www.wcrp-climate.org/wgsip-projects
Ongoing WGSIP Project

The Climate-system Historical Forecast Project

at Centro de Investigaciones del Mar y la Atmosfera

http://chfps.cima.fcen.uba.ar
https://www.wcrp-climate.org/wgsip-chfp

- CHFP - established following 2007 WCRP Workshop on Seasonal Prediction
- Envisaged as “CMIP for climate forecasting”
- Hindcast data from > 20 seasonal forecasting systems → always seeking more!
- Served at CIMA in Argentina
- ~200 registered users
- ~10^5 files downloaded in 2017
- Featured in recent BAMS article
**CHFP-based analyses**

**DJF NAO skill vs ensemble size & lid height 16 CHFP models**

- Butler et al., QJRMS (2016)

**Predictability of 500 hPa height in JJA (top) and DJF (bot) based on 11 CHFP models**


**Nino3.4 RMSE vs ensemble standard deviation for 9 CHFP models plus MME**

- Tompkins et al., BAMS (2017)

**Winter tropical Atlantic rainfall predictions and skills for 12 CHFP models and MME**

- Scaife et al., Int. J. Climatology (2018)

*Multi-model ensemble (MME) more reliable than single models*
Additional WGSIP activities & plans

- Working with WMO to enhance knowledge flow between research & operations (R2O, O2R)
  - 2nd WMO Workshop on Operational Climate Prediction, May 2018
  - Contributing to writing & review of WMO guidance document for operational climate prediction + other publications linking research, ops
  - This meeting

- Coordination of current projects focusing on aspects of land initialization

- Next full WGSIP meeting May 2019, Moscow
  - Scope next cycle of WGSIP projects (community input welcome)
  - Further develop R2O, O2R activities
  - Climate prediction school for young researchers
WGSIP role in decadal prediction

Decadal Climate Prediction Project (DCPP)

WGSIP

WCRP Grand Challenge on Near-Term Climate Prediction

science & technical standards for Lead Centre + Annual to Decadal Climate Update

WMO Lead Centre for Annual to Decadal Climate Prediction

research-driven hindcast experiments + ongoing ~real-time predictions

operational multi-model forecasts for WMO services
Decadal Climate Prediction Project (DCPP)

- Society is vulnerable to climate variability and change
  - food security
  - freshwater availability
  - spread of pests and diseases
  - extreme events (heat waves, droughts, floods, cyclones, and wildfires)
  - energy supply and demand
  - transport
  - migration
  - conflict

- Decadal predictions needed to support
  - Global Framework for Climate Services
  - UN Sustainable Development Goals
  - Sendai Framework for Disaster Risk Reduction

Images courtesy of Global Framework for Climate Services website
DCPP Component A: Hindcasts

- Assess skill and mechanisms
  - Start each year 1960-present
  - 10 ensemble members
  - [CMIP5: start every 5 years, 3 ensemble members]

Years 2-9, multi-model, 71 member mean

- Total skill
  - (a) Temperature
  - (b) Temperature
  - (c) Precipitation
  - (d) Precipitation
  - (e) Pressure
  - (f) Pressure

DCPP Component B: Ongoing forecasts

- Informal exchange of decadal forecasts every year since 2010
- 2017/18: endorsed by WMO
  - Lead Centre and four Global Producing Centres for Annual to Decadal Climate Prediction
  - Forecasts available from www.wmolc-adcp.org
- Support WCRP Grand Challenge on Near Term Climate Prediction
  - Paper: Towards Operational Predictions of the Near-Term Climate, Kushnir et al, submitted
  - Document: standards, verification methods and guidance
  - Annual to Decadal Climate Outlook to be produced each year
DCPP Component C: Mechanisms

- Investigate the global impacts and mechanisms of Atlantic and Pacific decadal variability

- Idealized experiments
- Pacemaker experiments
- Data withholding experiments

**Pacific**

- Ruprich-Robert et al. 2017

**Atlantic**

- CM2.1 DJFM
- CESM1 DJFM

- Ruprich-Robert et al. 2017
DCPP Component C: Volcanic impacts

- Repeat hindcasts but omit volcanoes
  - 1963 (Agung)
  - 1982 (El Chichon)
  - 1991 (Pinatubo)
- Repeat 2015 forecast but include fictitious eruption (Pinatubo, El Chichon, Agung)
- Run a new forecast as soon as possible after the next eruption
  - SPARC SSiRC to monitor and collect forcing data
  - Multi-model forecast (BSC, CCCMA, MPI, MOHC, …)

Impact on ENSO

Maher et al 2015

Impact on NAO
(Note: Model much weaker than obs)

Obs

Model

Driscoll et al 2012