Updates and new initiatives
+ data needs for seasonal outlooks

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WDAC Meeting, Darmstadt
5 March 2013
News

- New Chair: Greg Flato, Univ. of Victoria
- Director: Jenny Baeseman, Norwegian Polar Institute
- Project office had been dormant for 2 years
- Website redesigned, updated
- SSG meeting, February 4-7, Potsdam
  - Identify targeted activities
  - Focus on a few key initiatives
New steps forward

- Retain current working groups
  - Antarctic Sea-Ice Processes and Climate (ASPeCt), co-sponsored with SCAR
  - Arctic Sea Ice Working Group
  - CLIVAR/CLiC/SCAR Southern Ocean Panel
- Propose to co-sponsor ISMASS (Ice Sheet Mass Balance) with IASC and SCAR
- Establish a “Sea Ice and Climate Modeling Forum”
- Establish a “Permafrost Modeling Forum”
  - Continue support of Research Coordination Networks (RCNs)
New CliC Targeted Activities and Leads

1. Antarctic ice-shelf and ocean coupled modeling (D. Holland, E. Larour)
2. Understanding linkages between cryosphere elements (R. Massom)
3. Coordination of cryosphere observations for model evaluation and initialization (D. Dahl-Jensen, V. Romanovsky, M. Rafael, A. Jahn)
4. Arctic freshwater synthesis (T. Prowse, L. Hinzman, N. Koç)
Connections with international initiatives

- International Polar Initiative
- Global Cryosphere Watch
- WCRP Cryosphere Grand Challenge
  - Polar Climate Predictability Initiative
- Other prediction activities
  - Global Integrated Polar Prediction System
  - Polar Prediction Project
International Polar Initiative (IPI)

- Proposed follow-on from IPY
  - Originally discussed as Int’l Polar Decade
- Cooperative, thoroughly-planned, multi-agency program for high latitude (and high altitude regions, e.g., 3rd Pole?)
- Coordinate existing funding across nations and agencies (not new funding)
- Not just research, but also observations and services oriented
- Planned start 2017-2018
WMO Global Cryosphere Watch (GCW)

- Provide service-oriented information for decision-making and policy development
- Ensure comprehensive, coordinated and sustainable system of observations
  - Initiate “CryoNet” – network of reference sites and “super sites” in cold climate regions
  - Develop inventory of candidate satellite products for GCW
  - Establish best practices, guidelines and standards
  - Intercomparison of products
- Achievements to date:
  - Implementation plan approved
  - GCW data portal developed
  - Panels forming – “Snow Watch” (1st meeting in Jan 2013)
More coordinated focus on:

1. Seasonal, interannual, and long-term prediction and projection of polar climate; the role of the cryosphere in climate predictability

2. Analysis of model intercomparison results to understand and attribute model shortcomings

3. Improved representation of permafrost and high-latitude land surface in climate models

4. Develop/improve ice sheet models, especially dynamics and role in SLR
Component of WCRP cryosphere grand challenge, but with a scope extending beyond the cryosphere

Questions addressed:

- How predictable is Arctic climate?
- Why is polar climate changing unevenly between the two hemispheres?
- How will extreme events in polar regions and their impacts change?
Other polar prediction initiatives

- **WMO EC-PORS Global Integrated Polar Prediction System (GIPPS)**
  - Executive Council Panel of Experts on Polar Observations, Research and Services
  - “Global” refers to global participation and effect of poles on global processes
  - Coordinate over three timescales:
    - Short-term: WWRP-THORPEX/WCRP Polar Prediction
    - Medium-term: WCRP “Seasonal to Multi-decadal Predictability of Polar Climate”
    - Long-term: ice sheet mass balance and SLR
  - **Year of Polar Predictability (YOPP)**
    - Tentatively planned for 2017-2018
    - Intensive observational and modeling period to advance polar prediction capabilities
Coordinated ice sheet initiative

- Uncertainties in mass balance and contribution to sea level rise
  - Efforts have been undertaken (ISMASS Ice2sea, IMBIE), but need better coordination going forward
- Improved dynamics models
- Coupling of models – climate-to-ice sheets and ice sheets-to-climate
- International Ice Sheet Modeling Meeting?
Greenland Ice Sheet Mass Balance Results as of 2009

Total mass balance (Gt/yr)

Year


Thanks to W. Abdalati, Earth Science and Obs. Center, Univ. Colorado

K = Krabill et al.
T = Thomas et al
V = Velicogna and Wahr; Velicogna
R = Rignot et al.; and Rignot and Kanagaratnam
Z = Zwally et al.
C = Csatho et al
H = Hanna et al.
B = Box et al.
RL = Remillion et al.
S = Slobbe et al.

0.5 mm/yr sea-level rise

Figure adapted from IPCC, 2007
New coordinated estimates of ice sheet contributions to SLR for AR5

http://imbie.org; Shepherd et al., Science, 2012
Sea Ice Outlook – a start at seasonal prediction

- Started in 2008
- Ad hoc, little funding
- Voluntary contribution
- Informal
- Plans to become more formalized include
  - Dedicated support from agencies
  - Central suite of data products for initialization
  - Evaluation products, development of metrics

http://www.arcus.org/search/seaiceoutlook/
Predictions got slightly worse over the summer!
Initialization data for Sea Ice Outlook

- NASA IceBridge “quick look” products
  - Ice thickness & snow depth
  - Available ~6 weeks after collection, in time for June Outlook projections
  - Data archived and distributed at NSIDC
- Limited use in first year
  - Potential for more users
  - More data?
    - CryoSat-2?
Multi-decadal projections

Stroeve et al., GRL, 2012; Meier et al., The Cryosphere, 2013

AR5 models closer to historical conditions, but rate slower than observations

Shaded = ± 2 σ
Key data needs for seasonal ice outlooks

- Sea ice extent/concentration
- **Sea ice thickness**
  - Some locations more important than others?
  - Research to find optimal locations for targeted observations
- **Atmospheric reanalysis**
  - Winds, temperatures, fluxes
- **Ocean surface and near-surface properties**
  - Halocline thickness, subsurface heat fluxes
Key data needs for seasonal ice outlooks

- Provide as much uncertainty info as possible (e.g., grid cell errors)
- Central archive location for data products
  - At least a data portal for access
- Products on same grid and in same (or similar) formats; targeted subsets
- Timespan requirements (for synoptic, seasonal)
  - Concentration/thickness – single initialization
  - Ocean/atmosphere – want several weeks or months prior to start of projection period
  - Data need to be made available in timely manner
Relevant recent and upcoming workshops

- **2nd satellite sea ice products workshop**
  - 17-18 Feb 2013, Copenhagen
  - Sponsored by ESA Climate Change Initiative (CCI), CliC co-sponsor (CliC supported first workshop, Wash. DC., March 2010)
  - Passive microwave focus
  - 22 algorithms (!)
  - Validation data set being created for evaluation

- **CliC sea ice working group meeting**
  - 5-7 Jun 2013, Tromso
  - Connections between modeling, in situ and satellite observations
  - Determine observation needs for models
  - Fill gaps and improve sea ice modeling capabilities to predict future sea ice states
  - Antarctic community connection
CDR/ECV level sea ice concentration products

- NOAA/NSIDC Climate data record
  - http://nsidc.org/data/g02202
- EUMETSAT Sea Ice ECV
  - http://osisaf.met.no/
- NetCDF format with CF metadata
- Grid cell level QA
- Documentation including:
  - Processing software
  - Maturity matrix
NOAA/NSIDC CDR Daily Arctic sea ice 2007

Climate Data Record - Sea Ice Concentration
01/01/2007
Thank you!

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