THORPEX OVERVIEW

Acknowledgements: USTEC Members

USTSSC Workshop, 19-20 Sept, 2012
OUTLINE

• Historical perspective
  – Objectives

• International organization and activities
  – Ongoing work, next steps

• US organization and activities
  – Recent developments

• Looking ahead
  – Weather forecasting related research & operations
THORPEX 101

• Objective
  – Accelerate improvements in high impact weather forecasts

• History
  – WMO/WWRP sponsored program launched in 2004

• Approach
  – Research related to end-to-end forecast process
  – Coordination across
    • Components of forecast system
      – Observing, data assimilation, ensemble forecast, decision support systems
    • Nations & regions
    • Research & operational communities
  – Modernize / optimize forecast system
    • Allocate research resources to maximize overall economic impact
    • Adaptive & probabilistic approaches
      – Observations, covariances, physics, decision procedures
INTERNATIONAL ORGANIZATION

WMO - Commission for Atmospheric Research (CAS)

• World Weather Research Program - WWRP
  – Nowcasting, Mesoscale, Tropical Meteorology, Socioeconomic Research Applications, Numerical Experimentation (joint with WCRP), Verification
    • Joint Science Committee – JSC

• THORPEX – supported by voluntary contributions to Trust Fund
  – International Core Steering Committee - ICSC
    • Representatives of sponsoring organizations
  – Data Assimilation & Observing Systems (DAOS)
    • Ron Gelaro (former co-chair), Tom Hamill
  – Predictability & Dynamical Processes (PDP)
    • Istvan Szunyogh (co-chair), Craig Bishop
  – Global Interactive Forecast System – THORPEX Interactive Grand Global Ensemble (GIFS-TIGGE)
    • Zoltan Toth (former co-chair), Yuejian Zhu

• Regional Committees
  • (North) America (Malaquias Pena), Africa , Asia, Europe, Southern Hemisphere

• International Program Office – IPO
  • Coordination
MAJOR INTL. ACCOMPLISHMENTS

• **Focus on weather forecast research**
  – Science Symposia
  – Workshops
  – WG meetings
  – Training

• **Enhanced interactions between research & operations**
  – Training of forecasters, etc

• **Globally engage weather forecast community**
  – Africa health initiatives, etc

• **TIGGE**
  – Archive of operational global ensemble forecasts
    • 10 provider, 3 archive centers
US ORGANIZATION

- **US THORPEX Executive Committee** – USTEC
  - NASA
  - Navy
  - NOAA
  - NSF
  - US Representative to ICSC
  - Jared Entin
  - Melinda Peng
  - John Conrtinas
  - Chungu Lu
  - Zoltan Toth, Chair

- **US THORPEX Science Steering Committee** - USTSSC
  - Edmund Chang (Chair), Malaquias Pena (Co-chair)

- **US Program Office**
  - Supported by NASA, NOAA, NSF
  - Housed at NCAR – Pam Johnson
MAJOR US ACCOMPLISHMENTS

• 20+M THORPEX-related investments by agencies
  – Field campaigns, AOs, archives, etc

  Developed, tested, & operationally implemented

• Adaptive observations
  – Winter Storm Reconnaissance (WSR) program
    • National Weather Service

• Ensemble based data assimilation
  – Hybrid GSI-EnKF - NCEP

• Multi-center ensemble forecasting
  – North American Ensemble Forecast System (NAEFS)
    • NCEP, Canada, Mexico
    • + FNMOC - National Unified Operational Prediction Capability
INTERNATIONAL STATUS / ACTIVITIES

• Funding - Lower than expected
  – International, regional, and national / agency levels
    • Stakeholder Panel never organized / convened

• Organization
  – Observing System & DA WGs merged
  – SERA moved up under JSC/WWRP
  – Some ambiguity as to links between THORPEX & WWRP/JSC

• Research
  – Active WGs
  – Limited activities under RCs (except Europe?)

• Status report prepared for ICSC review
  – Delayed by 3 yrs

• Planning for 2 new WWRP initiatives
  – Polar & Sub-seasonal forecasting
  – Partially supported by THORPEX Trust Fund
  – Limited involvement from THORPEX WGs

• Legacy of THORPEX?
  – Plans to be discussed at ICSC meeting next month
THORPEX LEGACY – OPTIONS

THORPEX formally ends Dec 2014
Trust Fund contributions cease

• Option A
  – DAOS WG integrated into WWRP WG structure (under all options)

• Option B
  – 5-10 yr extension; Trust Fund open for contributions; 3 WGs, RCs remain as funds permit

• Option C
  – New 10-yr environmental prediction initiative launched for seamless prediction of high impact weather
    • In context of changing climate, in collaboration with WCRP
    • New Trust Fund initiated
    • Subseasonal/seasonal & polar prediction projects
    • THORPEX WGs may be sustained

• Option D
  – Like C except no “umbrella” program
    • Coordination for projects provided by WWRP and its JSC
      – Like for other WWRP projects
THORPEX LEGACY – USTEC STANCE

• THORPEX is big part of WWRP
  – THORPEX legacy & WWRP’s future tied

• Strong environmental prediction research supported
  – Hrs to seasons – either option C or D may work
    • Science-based collaboration between WWRP & WCRP needed
    • Option D may be organizationally clearer
    • Link with US Earth System Prediction Capability (ESPC) program
  – There may be limited US contributions (NSF)
    • Explore alternative funding sources (e.g., WWRP base, stakeholders)

• Clarify role of WGs vs. projects
  – Standing WGs promote research in basic areas
    • DAOS, WGNE, Ensemble, SERA
  – Time limited projects aimed at specific deliverables
    • Possibly regional focus
    • Leverage expertise in (re)new(ed) standing WGs
    • Reorganize other existing WGs into projects?
    • Sustain research – operations links & TIGGE archive
US STATUS / ACTIVITIES

• **Continued funding for PO** by agencies
  – Despite cut in NOAA funding

• **USTSSC reconstituted**
  – Activities resumed – workshop, etc

• **Science plan** completed
  – Intersection of process, forecast, & application studies

• **US implementation plan** for next 2-3 yrs
  – *How Science Plan maps onto agency initiatives/interests*
  – Form of post-THORPEX weather research?
BACKGROUND