WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

S2S Updates

Yuhei Takaya

WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

Contents

- S2S Steering Group meeting (held online, 22-24 Sep. 2020) Bill reported the recent WGSIP activity.
- Ocean, Land sub-projects

S2S Ocean Project (potential link to WGSIP LRFTIP)

1. S2S prediction and the ocean

- **model**: ocean initialization/bias
- **model**: SST drift
- **nature**: ocean initial state
- **nature**: ocean evolution

- Recent studies involving MJO:
  - ocean feedbacks to mean state moisture may be key (H. Kim et al., 2016; Son et al., 2017)
  - ocean evolution is important for some MJO events (Fu et al., 2015; Zhao and Nasuno, 2020)
- Overview paper on these topics is in preparation (C. DeMott, N. P. Klingaman, and possibly others)

S2S Ocean Project (potential link to WGSIP LRFTIP)

2. Systematic coupled bias in the tropical Indian Ocean

- joint project involving BoM-UKMO-ECMWF:
  share a common ocean model (NEMO-ORCA25)
  will use all available data (including S2S) to look at daily evolution of bias
- focus on May 1 starts, when largest EIO cold biases develops
- ocean variables: SST, SSH, OHC

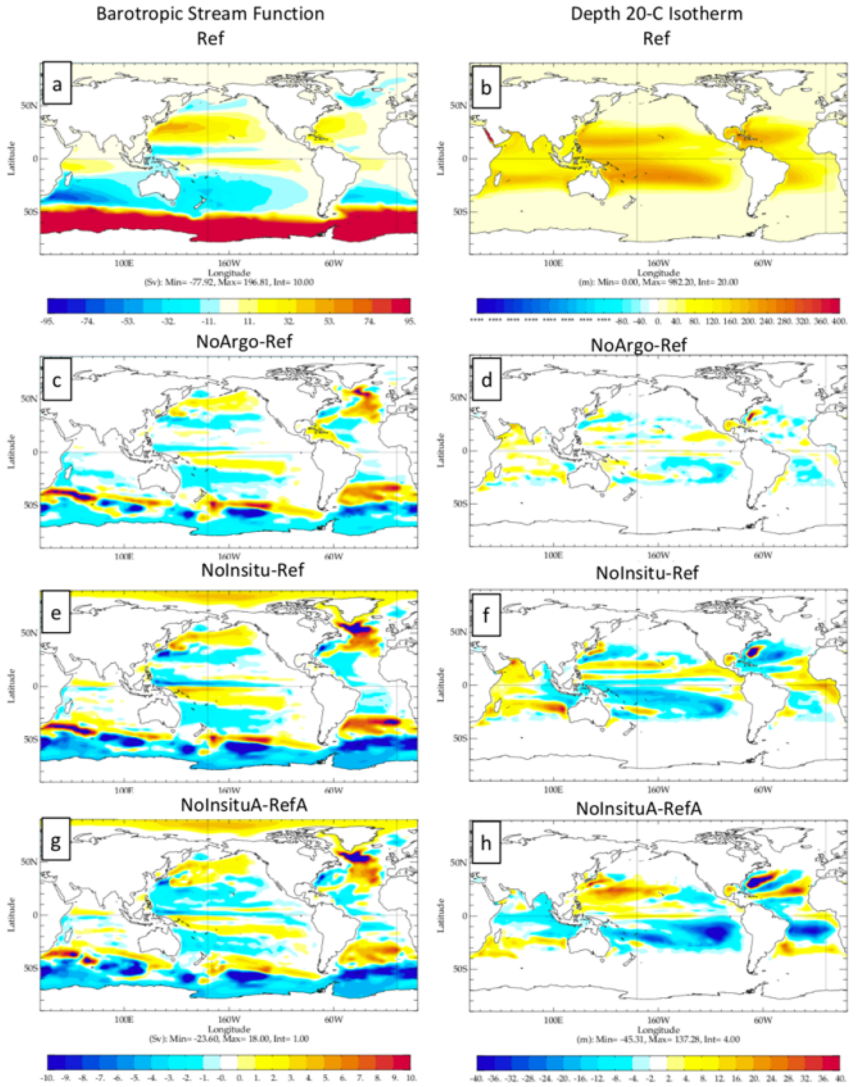
S2S Ocean Project (potential link to WGSIP LRFTIP)

3. Tropical Pacific OSEs

Magdelena Balmaseda,
Frederic Vitart, and
Beena Balan Sarojini (ECMWF)

Aneesh Subramanian and
Kris Karnauskas (CU Boulder)

Charlotte DeMott (CSU)



WMO OMM

Land sub-project (potential link to WGSIP SNOWGLACE)

LS4P = Land Surface for Prediction

- Focus: large-area land temperature anomalies (and systematic biases in models) over elevated terrain (elevated heat sources have greater impact on circulation that lowland temperature anomalies).
  - Tibet (Third Pole) has been initial area of study
  - Intent to spread to W. North America (Rockies and associated high plateaus) and Andes (including Bolivian *Altiplano*).
- Currently 21 global model participants, 9 regional models.
- Three tasks:
  1. May-June 2003 baseline runs, determine model biases.
  2. Compare to retrospective forecast suites, determine model anomalies.
  3. Rerun with masked anomaly initialization, bias adjusted.

S2S SG/LG – 23 September 2020 Land Sub-project / Dirmeyer

COLA GEORGE MASON UNIVERSITY

From the slides of Paul Dirmeyer

LS4P

Lead:Co-Chairs:
Yongkang Xue (yxue@geog.ucla.edu),
Tandong Yao (tdyao@itpcas.ac.cn)
Aaron Boone (aaron.boone@meteo.fr)
Website: https://ls4p.geog.ucla.edu/

Project Goals

- What is the impact of the initialization of large scale LST/SUBT and snow pack, including the aerosol in snow, in climate models on the S2S prediction over different regions?
- What is the relative role and uncertainties in these land processes versus in SST in S2S prediction? How do they synergistically enhance the S2S predictability?

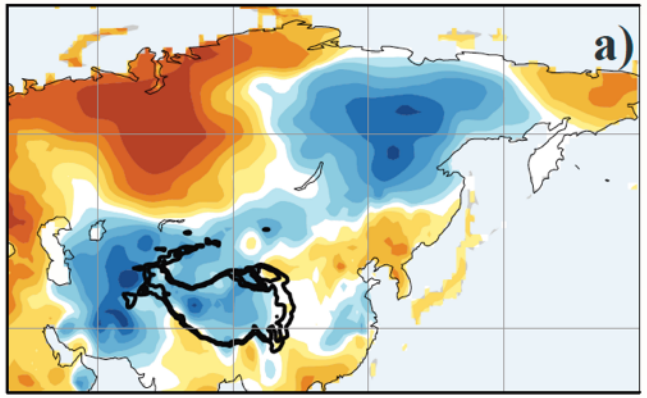
WMO OMM

Task 1 Results

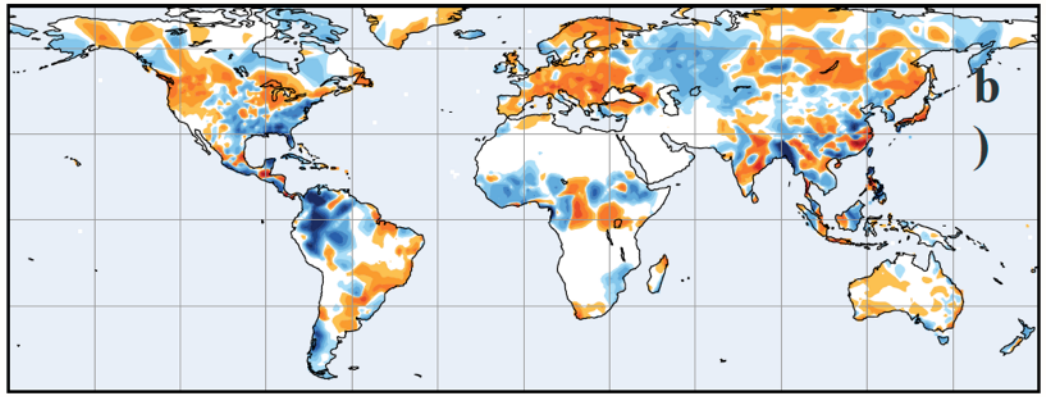
Paper to be submitted soon to GMD

Comparison between observed anomalies and 20 LS4P Models ensemble mean BIAS

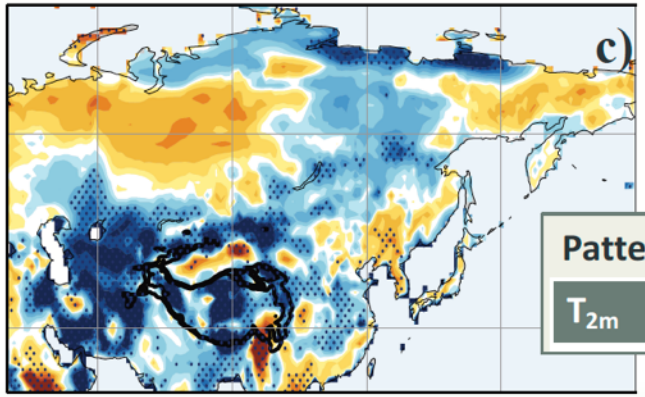
Observed May 2003 T_{2m} anomalies (˚C)



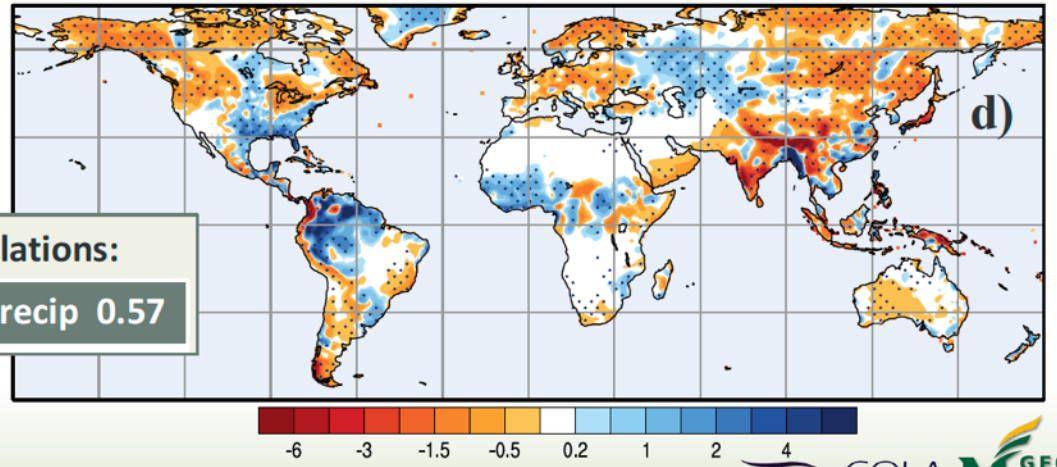
Observed June 2003 Precipitation anomalies (mm/day)



Model Ensemble mean May 2003 T_{2m} Bias



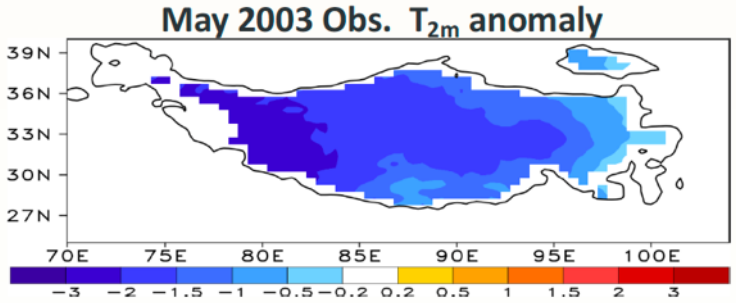
Model ensemble mean June 2003 Precipitation Bias

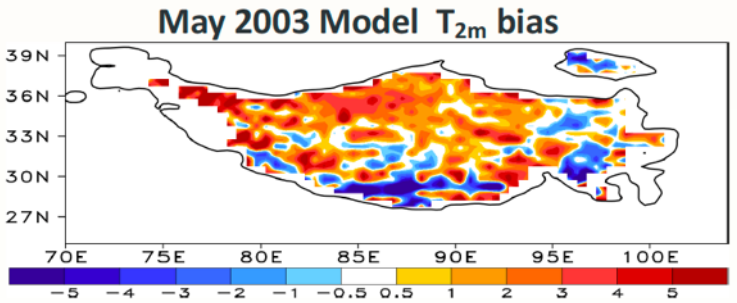


Pattern Correlations:

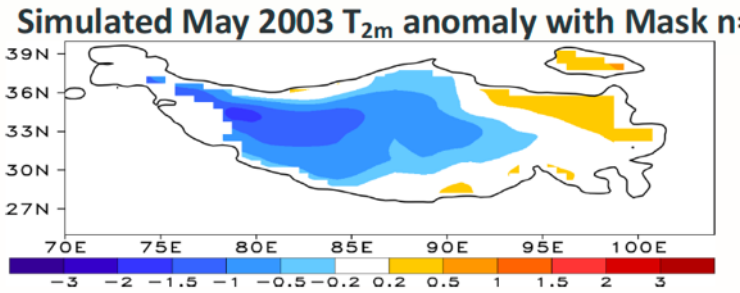
T_{2m} 0.37	Precip 0.57

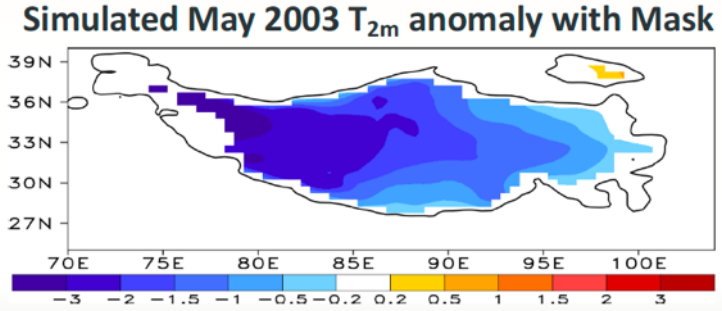
Accounting for Biases over TP



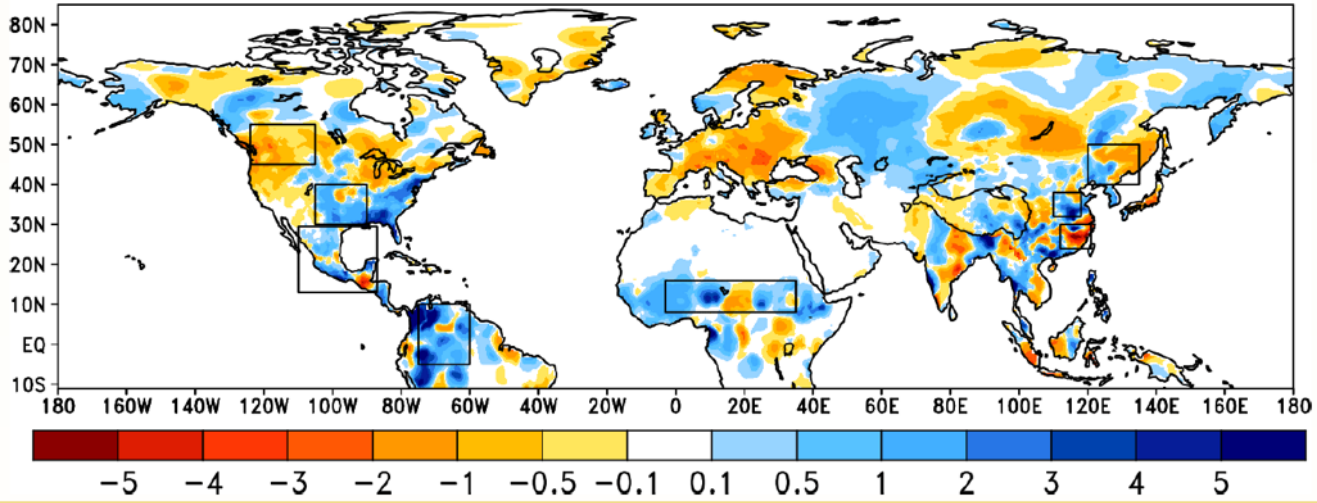


- A tuning factor n scales the IC anomaly to account for the lack of heat capacity in the shallow soil column in forecast models.
- A mask over TP is used to persist the IC anomaly by reintroducing it 1-14 days later, to counteract model surface energy balance biases that cause drift.

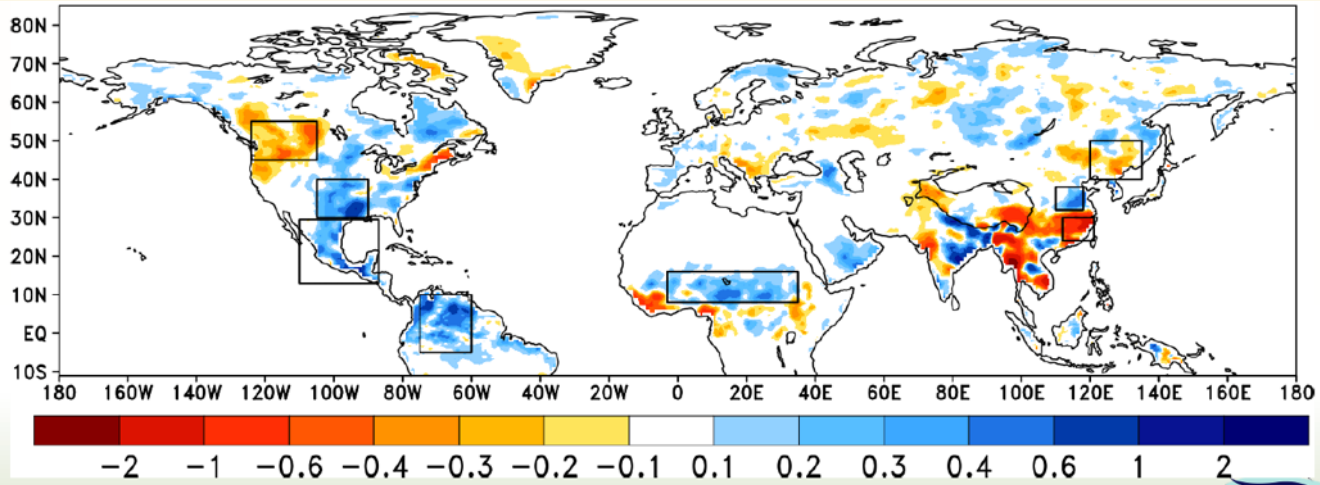




Observed June 2003 Precipitation Anomaly



Task 3 results: 14-model Ensemble Mean: June 2003 precipitation anomaly due to LST/SUBT effects



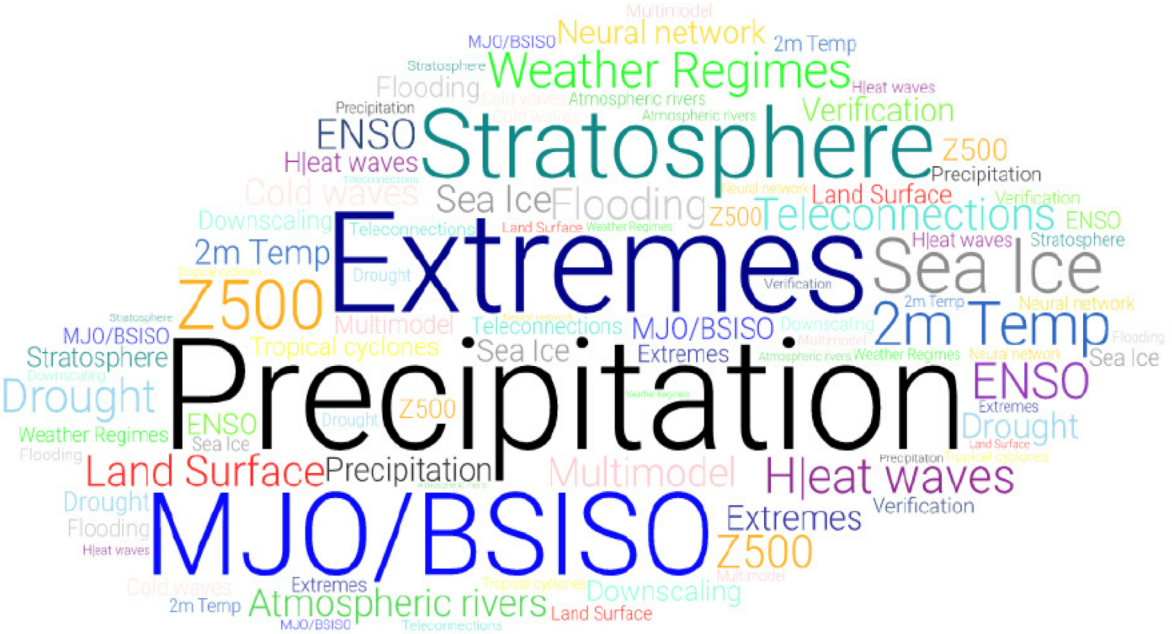
Xue et al. (submitted to GMD)

ExCPEns Workshop

- S2S relevant activities & participation
  (F. Vitart in the Scientific Organizing Committee)
- Extreme (in Climate Prediction Ensemble) is a major research topic using S2S.

- More than 160 publications
- Most popular topics:

1. Precipitation
2. Weather Extremes
   …



From the presentation of Dr. Manuel Fuentes at the S2S SG meeting.

GPC-SSF, LC-MMESSF

- It was originally planned to propose the designation criteria for sub-seasonal GPCs (GPC-SS) and associated Lead Centre (LC-SSFMME) for approval by WMO Executive Council later this year.
- → It was decided that this proposal is postponed due to the WMO procedure during the WMO reform.
- The proposal will be discussed by INFCOM (and tabled at the next Cg?).


WMO OMM