INTERNATIONAL WORKSHOP ON CLIMATE DOWNSCALING STUDIES

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Session 4: Interdisciplinary Studies on Regional Climate Studies

Report

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Localized Climate Data and Risk Information in Support of Transformational Climate Change Adaptation in the Agriculture Sector

- FAO concentrates mainly on SDG 2. Climate change effects: **resilient agricultural practices, increase productivity, and adaptation to extreme weathers.**
- Related to DS scientists, SDG 13 (Climate Action) mentions the **Green Climate Fund** and how it should be directed to develop **meaningful mitigation actions and their implementation.**
- FAO supports projects shifting equally between adaptation and mitigation, aiming to a 50:50 balance over time. The investment engages directly with private and public sector. And, the adaptation allocation of fund is mainly directed to the most vulnerable countries.
- Some Examples: water-related, agriculture, irrigation, infrastructure.
- There is a need for a more localized information about vulnerability and risks supported by robust evidence.
- Transformational climate adaptation should be long-term oriented, beyond development, beyond one-time investment and have an innovative approach
- The studies should be aware of the national and regional policies, and advice how the authorities should allocate the resources.
- Scale matters, country-ownership, promote evidence

Discussions: Opportunities for local institutions to collaborate, how and with whom?

Prof. Douglas Maraun, University of Graz

Challenges in Downscaling Research

- It has been criticized how there is a lack of science in the adaptation plans. Therefore, it should be evaluated how useful actually can be downscaling.
- Issues:
  - Bias are errors that come from different sources, which have a different impact by climate signal.
  - Sometimes, bias does not make sense, anything can be bias corrected because that is for what it is being calibrated.
  - Extremes show more bias at lower scales even if the correction at lower scales was successful.
  - Simulations with different parameterization schemes show different results.
  - The correction is meaningless if the models cannot solve well the **small scale issues**.
- **Validation Tree:**
  - Identify the user's problem and define which climatic phenomena is relevant to that problem.
  - Which aspects are triggering this phenomena, whether it is a problem of marginal distributions, temporal, spatial or even intervariable. And finally decide which indices are more appropriate to evaluate the performance of the model
- The models or methods should try to resolve the small scale issues and be able to reproduce the analyzed phenomena. Less is more -> More robust not always the best practice

Key Words: process-informed downscaling, focus selection on individual applications, process-based model selection
Discussions: Weather Generators (to much information less physics), applications in sparse regions

Prof. Ke-Sheng Cheng
National Taiwan University

Estimating Design Rainfalls Using Dynamical Downscaling Data

- Hydrological modeling requires design rainfalls that mostly depend on past observations and a statistical analysis of past extreme events.
- How to use climate models to do this kind of analysis.
- Design rainfalls depend on rainfall types and have different characteristics like time to peak and peak rainfall percentage.
- The data is very limited to perform a proper analysis of extreme events, therefore, instead of considering annual maximums, they propose using event maximums.
- Moreover, they propose a mixture of mixture of distributions in order to be able to have design rainfalls for each type of rainfall types.
- The results showed good agreement with observed data, even capturing the dominance of typhoons in the analyzed areas.

Key words: hydrological modeling at local scales, adaptation to available climate data

Discussions: Ensembles of models can improve this analysis? May be not

Prof. Masaru Inatsu
Hokkaido University

Toward Substantial Social Implementation of Climate Change Adaptation Technology. An Advanced Attempt in Hokkaido

- This talk was aimed to give an extensive answer to a questions made by Mr. Takayabu 2 years ago.
- In 2016, 6 typhoons approached the Hokkaido island causing extreme precipitations.
- RECCA, which is a Research Program on Climate Change Adaptation: develop software to refer hydrological and weather information for climate adaptation projects. The output is available to local governments, private sector, Covering agriculture, water resources, energy, tourism and transportation.
- Their studies consider the results of various possible futures combining GCMs and Regional Atmospheric Models (concerned about climate sensitivity, and consider different emission scenarios)
- Some of the results show an increase of precipitation due to water vapor increase, and very likely temperature will increase by 3 to 4 K by the end of this century.
- Some interesting examples were given about the impacts of the estimated climate change like potatoes not dying, likely decrease of sugar production, quality-reduction of snow, wine production conditions will be favorable, and the generation of line-shaped rainfalls causing a change in the risk-vulnerable areas.
- 2016: special committee for water hazard was created
- 2017: climate change adaptation was implemented in Hokkaido

Key words: data distribution, local impact-assessment, creation of local policies