

## **Session C1: Representing and projecting extremes**

**Thursday May 19**

**Co-chairs: Bill Gutowski & Hyun-Suk Kang, rapporteur Bill Gutowski**

This session opened with an overview of climate extremes across scales by Jana Sillmann, covering extremes in global to regional climate simulations. She presented her talk in the context of the WCRP Grand Challenge to Understand and Predict Weather and Climate Extremes. She first reviewed the challenges of extremes, such as their rarity, lack of observational data and scale mismatches between observations and model output.

She noted that regional models offer opportunity to simulate scales closer to the actual scales of short-term extreme events, but the availability of sufficient observations is a challenge. She presented examples of regional simulations of extreme heat, cold and precipitation from several CORDEX regions, noting that definitions of “extreme” varies with analyses. The different definitions should be viewed as complementary approaches that each have value according to the context and scientific questions analyzed.

The further oral presentations featured a variety of evaluations of CORDEX simulations for weather and climate extremes in different CORDEX regions. A common feature in several of the presentations (Drobinski, Park, Arritt) was a demonstration that simulations for their regions gave increases in extreme daily precipitation that tended to follow Clausius-Clapeyron scaling.

Emilia Diaconescu and colleagues computed ETCCDI indices for northern Canada to show that reanalyses and models both have good skill in simulating warm extremes, and one- and five-day precipitation extremes, but have difficulty simulating some cold extremes and wet-day indices. Philippe Drobinski showed a distinctive “hook shape” in daily precipitation extremes versus temperature in the Mediterranean, with extremes having lower magnitudes at the highest temperatures. Claas Teichmann presented changes in the areal coverage of precipitation extremes for Europe for low-warming scenarios. Results indicated that the area affected by heavy precipitation will continue to increase to mid-century. Riccardo Bonanno used some of the ETCCDI indices to show the impacts of climate change on electric power generation in Europe. Changyong Park showed a close relationship in East Asia for projected increases in means and extremes for both temperature and precipitation. Izidine Pinto showed for southern Africa that regional simulations can add value to the GCMs they downscale, with the downscaling generally consistent with observations for contemporary climate. Ray Arritt presented results from simulations using various combinations of two convection schemes, two resolutions and two driving GCMs. There was a somewhat surprising lack of sensitivity in results to the resolutions used (25 km, 50 km). Mirseid Akperov conclude the session with an examination of cyclone activity in the Arctic. State-of-the-art Arctic RCMs can resolve about 60% of polar lows seen in reanalyses, but strong variations in cyclone frequency occurs across reanalyses as well as models, possibly due to polar lows.