

Summary of Session C2: Regional atmospheric and oceanic circulation systems

Thursday May 19

Chairs Daniela Jacob and Stefan Sobolowski, rapporteur Stefan Sobolowski

This session featured a wide range of engaging talks, which took us from sub-Saharan Africa to the Mediterranean to the Baltic Sea. Sarah Pryor from Cornell University gave the first talk. She examined the potential impacts that climate change could have on the wind energy sector both with respect to energy production and operations. While current standards provide a large enough safety margin there are still large uncertainties with respect to the impact climate change will have on production at regional scales. Our second talk moved to another renewable resource: solar power. Claudia Gutierrez Escribano from Universidad de Castilla-La Mancha presented present day solar radiation variability over the Iberian Peninsula and its influence on PV productivity. We stayed in the Mediterranean region for the next talk but ventured into the ocean where Gianmaria Sannino from ENEA presented exciting work on the thermohaline circulation and tidal forcing in the Mediterranean Sea. This work is critical from the perspective of fully coupled regional ocean-atmosphere modeling systems. Pedro Soares (Instituto Dom Luiz) next presented changes in the coastal low-level jet along the Iberian Peninsula. He noted an increase in wind speed, frequency of occurrence, height and offshore expansion under changing climate conditions. Next Jennifer Brauch (Deutscher Wetterdienst) presented a regional coupled modeling investigation of snow bands over the Baltic Sea. She showed the importance of coupling for reproducing the enhanced convection that characterizes these phenomena. Next, Markus Meier stayed in the Baltic to present the considerable changes that may occur to oceanic ecosystems under changing climate conditions. This, in spite of model shortcomings and large uncertainties. Anike Obermann from Goethe-Universität Frankfurt next presented projected changes in Mistral and Tramontane winds in regional modeling systems. These mesoscale phenomena are important for the regional hydroclimate but are not captured by global model systems. We then shifted back to renewables with Thomas Remke (GERICS) who presented a methodological framework to assess the climate related impacts on critical energy infrastructure, specifically wind energy. His critical point was the need for sector specific frameworks for sector-specific information and process level information that can only come from very high resolution, convection permitting climate simulations. Finally, Stefan Sobolowski (Uni Research, BCCR) presented an analysis of regional models' ability to reproduce the critical dynamics and thermodynamics of the the East African Low Level Jet. Despite well-known difficulty with reproduction of thermodynamically driven aspects the regional simulations capture well the large-scale dynamics related to the timing and seasonal cycle of the EALLJ. A common theme throughout the presentation was the focus on phenomena with strong local to regional or even mesoscale components. Further, the need for coupled modeling systems, robust ensembles and process-level evaluations was also emphasized.

