



Description and evaluation of the Earth System Regional Climate Model (RegCM-ES)

Riccardo Farneti (1), Lina Sitz (1,2,3), Fabio Di Sante (1), Ramon Fuentes-Franco (4), Erika Coppola (1), Laura Mariotti (2), Marco Reale (1,2), Gianmaria Sannino (5), Marcelo Barreiro (6), Rita Nogherotto (1), Graziano Giuliani (1), Giorgio Graffino (1), Cosimo Solidoro (2), and Filippo Giorgi (1)

(1) ICTP, Earth System Physics Section, Italy, (2) OGS, Italy, (3) Universidad Nacional del Sur, Argentina, (4) Rossby Centre, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden, (5) Climate Modelling and Impacts Laboratory, ENEA, Italy, (6) Universidad de la Republica, Uruguay

The increasing availability of satellite remote sensing data, of high temporal frequency and spatial resolution, has provided a new and enhanced view of the global ocean and atmosphere, revealing strong air-sea coupling processes throughout the ocean basins. In order to obtain an accurate representation and better understanding of the climate system, its variability and change, the inclusion of all mechanisms of interaction among the different sub-components, at high temporal and spatial resolution, becomes ever more desirable. Recently, global coupled models have been able to progressively refine their horizontal resolution to attempt to resolve smaller-scale processes. However, regional coupled ocean-atmosphere models can achieve even finer resolutions and provide additional information on the mechanisms of air-sea interactions and feedbacks. Here we describe a new, state-of-the-art, Earth System Regional Climate Model (RegCM-ES).

RegCM-ES presently includes the coupling between atmosphere, ocean, land surface and sea-ice components, as well as an hydrological and ocean biogeochemistry model. The regional coupled model has been implemented and tested over some of the COordinated Regional climate Downscaling Experiment (CORDEX) domains. RegCM-ES has shown improvements in the representation of precipitation and SST fields over the tested domains, as well as realistic representations of coupled air-sea processes and interactions. The RegCM-ES model, which can be easily implemented over any regional domain of interest, is open source making it suitable for usage by the large scientific community.