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Precipitation projections of the first multi-model ensemble of regional climate simulations at convection permitting scale

Emanuela Pichelli¹, Erika Coppola¹, Nikolina Ban², Filippo Giorgi¹, Paolo Stocchi³, Antoinette Alias⁴, Danijel Belušić⁵, Segolene Berthou⁶, Cecile Caillaud⁴, Rita M. Cardoso⁷, Steven Chan^{6,8}, Ole Bøssing Christensen⁹, Andreas Dobler¹⁰, Hylke de Vries¹¹, Klaus Goergen¹², Elizabeth J. Kendon⁶, Klaus Keuler¹³, Geert Lenderink¹¹, Torge Lorenz¹⁴, Aditya N. Mishra¹⁵, Hans-Juergen Panitz¹⁶, Christoph Schär¹⁷, Pedro MM. Soares⁷, Heimo Truhetz¹⁵, and Jesus Vergara-Temprado¹⁷

¹Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy (epichell@ictp.it)

²University of Innsbruck, Innsbruck, Austria

³Institute of Atmospheric Sciences and Climate, National Research Council of Italy, CNR-ISAC, Bologna, Italy

⁴CNRM, CNRS University of Toulouse, Meteo-France, Toulouse, France

⁵Swedish Meteorological and Hydrological Institute (SMHI), Norrköping, Sweden

⁶Met Office Hadley Centre, Exeter, UK

⁷Instituto Dom Luiz, Faculdade de Ciências, Universidade de Lisboa

⁸Newcastle University, Newcastle, UK

⁹Danish Meteorological Institute (DMI), Copenhagen, Denmark

¹⁰The Norwegian Meteorological Institute, Oslo, Norway

¹¹Royal Netherlands Meteorological Institute (KNMI), de Bilt, Netherlands

¹²Institute of Bio- and Geosciences (IBG-3, Agrosphere), Research Centre Jülich, Jülich, Germany

¹³Brandenburg University of Technology Cottbus - Senftenberg, Germany

¹⁴Norwegian Research Centre (NORCE), Bjerknes Centre for Climate Research, Bergen, Norway

¹⁵Wegener Center for Climate and Global Change (WEGC), University of Graz, Graz Austria

¹⁶Karlsruhe Institute of Technology (KIT), Institute of Meteorology and Climate Research (IMK-TRO), Karlsruhe, Germany

¹⁷Institute for Atmospheric and Climate Science, ETH-Zurich

We present a multi-model ensemble of regional climate model scenario simulations run at scales allowing for explicit treatment of convective processes (2-3km) over historical and end of century time slices, providing an overview of future precipitation changes over the Alpine domain within the convection-permitting CORDEX-FPS initiative. The 12 simulations of the ensemble have been performed by different research groups around Europe. The simulations are compared with high resolution observations to assess the performance over the historical period and the ensemble of 12 to 25 km resolution driving models is used as a benchmark.

An improvement of the representation of fine scale details of the analyzed fields on a seasonal scale is found, as well as of the onset and peak of the summer diurnal convection. An enhancement of the projected patterns of change and modifications of its sign for the daily precipitation intensity and heavy precipitation over some regions are found with respect to coarse resolution ensemble. A change of the amplitude of the diurnal cycle for precipitation intensity and

frequency is also shown, as well also a larger positive change for high to extreme events for daily and hourly precipitation distributions. The results are challenging and promising for further assessment of the local impacts of climate change.