



## **Climate SPHINX: High-resolution present-day and future climate simulations with an improved representation of small-scale variability**

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The PRACE Climate SPHINX project investigates the sensitivity of climate simulations to model resolution and stochastic parameterization. The EC-Earth Earth-System Model is used to explore the impact of stochastic physics in 30-years climate integrations as a function of model resolution (from 80km up to 16km for the atmosphere). The experiments include more than 70 simulations in both a historical scenario (1979-2008) and a climate change projection (2039-2068), using RCP8.5 CMIP5 forcing. A total amount of 20 million core hours will be used at end of the project (March 2016) and about 150 TBytes of post-processed data will be available to the climate community. Preliminary results show a clear improvement in the representation of climate variability over the Euro-Atlantic following resolution increase. More specifically, the well-known atmospheric blocking negative bias over Europe is definitely resolved. High resolution runs also show improved fidelity in representation of tropical variability - such as the MJO and its propagation - over the low resolution simulations. It is shown that including stochastic parameterization in the low resolution runs help to improve some of the aspects of the MJO propagation further. These findings show the importance of representing the impact of small scale processes on the large scale climate variability either explicitly (with high resolution simulations) or stochastically (in low resolution simulations).