

## ***Interactive comment on “WCRP COordinated Regional Downscaling EXperiment (CORDEX): A diagnostic MIP for CMIP6” by William J. Gutowski Jr. et al.***

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This reviewer has two primary points: (1) comments on the Flagship Pilot Studies, which the reviewer approves, and (2) comments on the CORE plans, which the reviewer disapproves. We note that the CORDEX structure is decided by the CORDEX community, and both parts of the program have been reviewed and modified in discussions by the CORDEX Science Advisory Team and in public forums such as the CORDEX 2016 conference held May 2016 in Stockholm.

On the Flagship Pilot Studies, we appreciate that the reviewer finds them as an opportunity for bottom-up innovation in the CORDEX community. Indeed, the FPS approved so far have provided opportunities for advancing CORDEX in some of its Regional

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Challenges, such as regional coupled-model activities and precipitation simulation. The reviewer appears to believe that the FPS directly involve the VIA community. While FPS are intended to be VIA-aware, they do not necessarily involve the VIA community directly when addressing the Regional Challenges.

The reviewer does not like the CORE plans, feeling in part that it is mimicking CMIP and that it is simply trying to be part of a race to finer resolution. We note that the IPCC has expressed interest in CORDEX output for future assessments, a point now stated in the paper, and one need in that regard is a systematic, well-structured set of simulations that cover most, if not all, of the CORDEX regions, in order to provide simulation output that is as homogeneous as possible across the CORDEX regions. The FPS, as pilot studies, focus on one region and thus cannot do this. CORE was thus conceived in part to be responsive to IPCC interests for coordinated simulations that can potentially provide additional information beyond what GCMs can provide on climate change for regions.

The transition to finer resolution is motivated primarily by the outcomes of previous exploratory studies that have shown there is better resolution of key regional processes when simulating at 10-20 km grid spacing. While simulation at much finer scales might possibly be desirable, that needs much more exploration before committing substantially greater resources (at least an order of magnitude greater computing demand). That is the purpose of the FPS: to explore the possible benefits of yet finer resolution. Moreover, the CORE plans purposely dovetail with efforts in HighResMIP, so that output would provide a basis for examining side-by-side the advantages and challenges in both approaches (fine resolution global simulation and fine resolution simulation by downscaling). We also note that the need for finer resolution climate information is now and not some 20 years into the future when GCM may be regularly simulating at such resolutions.

While the reviewer may disagree with the planned CORE, we note again that this is a program element that has been subject to discussion and revision within the CORDEX

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community, and therefore it needs to be retained within the manuscript, whose role is not to present a proposal for the program but rather to describe the current plans and discussions around it.

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