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Preliminary results of a regional ocean model forced with downscaled IPCC-AR4 results

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This poster presents results from an initiative to analyze and include IPCC-AR4 scenarios in a downscaling process, focusing on the (Central Western) South Atlantic. We aim to scrutinize GCMs model results in the area, testing local sensibility to climate change and its local small scales interactions. Initially the efforts have been concentrated into the regional model setup and validation process, at South Atlantic. The initial experiments aim to evaluate the physical general behavior relative to long term processing and the model setup applicability to reproduce regional circulation features driven by global climate scenarios. The results from this step are presented here. The main goal of this work is to implement a regional ocean model and establish relationships between the local circulation and global climate patterns. We expect to achieve these results isolating GCMs specific modes, correlated with local responses and use them to reproduce local events. Since the Brazilian southwest coastal zone is densely populated and concentrates important economical activities, we also expect with this approach to obtain regional model projections for the ocean where it can directly impact the coast. If well succeeded, this methodology will have applicability to translate climate events and change from the global to local, more human scale, and so, permitting more accessible mitigation studies. The oceanic model in use is the Regional Ocean Model System (ROMS), downscaled at 4km resolution in the focused area, using CORE as a reference for the 20th century. The results are then compared to a 50yr simulation forced with NCEP fluxes. The first experiment uses CCSM 20th C results as forcing. The domain definition uses some telescopic grid resources, to optimize the quality and minimize errors due to the uncoupled connections between GCMs results and the model itself. The 20th C ocean momentum transport and dynamical features is used to quantify the model adjustments in the area. Here we are presenting a physical-physical long-term scale interaction in the area where the specific focus is the Brazil and Malvinas Currents. The goals described are quite ambitious if considered as a stand-alone project. However we expect to join other research initiatives, considering that this kind of study has immediate benefits at the local level. If proven correct, the methodology has universal applicability. So, presently, it is critical to develop partnerships and extend the results to other climate related applications.