Evaluation of the IOD Simulation in CGCMs

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Indian Ocean Dipole (IOD) is a basin-scale ocean-atmosphere coupled mode, which is strongly phased-locked to the monsoon seasonal cycle. Hence the IOD simulation in coupled GCMs (CGCMs) relies not only on the ocean-atmosphere coupled processes, but also heavily on the model's capability of monsoon annual cycle. Using the data from the IPCC CGCMs, the model performance of IOD is evaluated, through checking the monsoon annual cycle's impact on IOD as well as the various dynamic and thermal-dynamic feedbacks between the ocean and atmosphere. The CGCMs could simulate the IOD events but their performance show large divergence. It is clearly demonstrated that the model errors comes from the monsoon annual cycle and the air-sea feedbacks. This analysis highlights the ways to improve the CGCMs.