



The influence of tropical SSTs on Antarctic climate

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We examine the influence of tropical sea surface temperatures (SSTs) on the circulation around Antarctica, focussing on the mean sea level pressure (MSLP) field. We use the Hadley Centre coupled ocean-atmosphere model HadCM3 and its atmospheric component HadAM3, the latter forced by imposed SSTs. HadCM3 has significant MSLP errors compared to HadAM3, which itself reproduces observations rather well. The largest of these errors in winter are over the seas around Antarctica. A series of HadAM3 runs forced with SST anomalies shows that the MSLP errors in HadCM3 are directly attributable to its SST errors, and are largely attributable to the tropical errors, in particular positive ones, and in particular those around Indonesia. We show that the response pattern within the model can largely be understood by Rossby wave dynamics. Continuing, we then examine the response of HadAM3 to a series of idealised SST anomalies to explore the dependence of the response on the mean-flow. We then use this to try to explain the differing impacts of apparently similar ENSO events on the Antarctic climate.