



An analysis of the atmospheric processes driving the large-scale winter sea-ice variability in the Southern Ocean

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The response of the sea-ice in the Southern Ocean to the variability of the atmosphere is investigated using both model and observational data. The model results are derived from a simulation performed with the ORCALIM model, driven by the NCEP/NCAR (National Centers for Environmental Prediction-National Center for Atmospheric Research) re-analysis of daily near-surface air temperatures and winds and by monthly climatologies for precipitation, cloud cover and relative humidity. Our results show that, in line with previous investigations, the classical modes of atmospheric variability do not explain a large part of the winter sea-ice variability integrated over the entire Southern Ocean. In the regression between the ice extent and the atmospheric pressure, the dominant mode is a static, non-symmetric wave 3 pattern. However, the sea-ice extent in the Southern Ocean does not seem to behave as a single entity: its variability is the result of the combination of regional sea-ice changes. Consequently, each sector has to be examined separately.