

IMPACT OF REDUCED SEA ICE CONCENTRATION ON THE ANTARCTIC MASS BALANCE

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1. INTRODUCTION

The study of climate in polar regions is complicated by the existence of sea ice. Associated with this it has been suggested that the polar regions may undergo greater Greenhouse Effect changes than would be experienced elsewhere, because of the albedo-temperature effects of the sea ice. These perturbations to the polar environments are of relevance to the International Geosphere Biosphere Program because they will have an impact on the climate of the whole globe. The changes in the Southern Hemisphere (SH) may be particularly marked because of the very dynamic nature of Antarctic sea ice being, as it is, located at lower latitudes and less confined by the continents than its northern counterpart. The potential severity of some of these effects behooves us to increase our understanding of the interaction of the various processes.

It is now well appreciated that the presence of sea ice dramatically changes the fluxes of heat and momentum across the air-surface interface. The albedo and roughness of a sea ice cover differ so greatly from those over open water that the above fluxes can differ by orders of magnitude or even have opposite signs.

Modern remote sensing techniques have enabled us to obtain a comprehensive picture of the spatial and temporal distribution of sea ice over the globe (e.g., Zwally *et al.* [1], Parkinson *et al.* [2] and Gloersen & Campbell [3]). The findings of these studies make it clear that polar sea ice cannot be thought as a continuous slab but has within it large areas of open water (or 'leads'). It follows from what was said above that even