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# SENSITIVITY TEST FOR SEA ICE THICKNESS SIMULATED BY PUNCTUAL MODEL ON THE WEDDELL SEA

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## RESUMO

In a basic definition, the sea ice is resulted from the freezing of the sea water. The growth is ruled by the energy balance on the upper and lower surfaces of the sea ice. The freezing and melting dynamics occurs with heat transfering throughout the mass of ice from its center towards surface.Therefore, the numerical models standing for the Sea Ice Thickness represent the ice column divided in several layers, in order to calculate the thermal conductivity between those layers. The objective of this study is to identify the maximum number of layers required to represent the Sea Ice Thickness in the Southern Ocean. The study area is on the Weddell Sea (WS), located between latitudes 83°S/55°S and longitudes 84°W/10°E. The simulations of Sea Ice Thickness, Snow Thickness and Air Temperature were performed in 2009 to 2017 for two distinct points on the WS, being the first denominated PT1 (classified as undefined, because of the presence or absence of ice depending on the time of year in which data were acquired) and Gekstaller (classified as permanent ice layer). For each point 20 simulations were realized. Daily flows, named Latent Heat, Sensitive Heat, Long Wave Radiation, Shortwave Radiation and Albedo from the National Centers for Environmental Prediction (NCEP), were used as input data. In PT1 a greater variation in radioactive closure was observed , and larger changes in Sea Ice Thickness in relation to the point Gekstaller. In all PT1 layers, high values of Snow Thickness, mainly in layers 1, 2, 3 and 4, were obtained in the first years of. The model represented reasonably well the Air Temperature in the two selected points, being, the temperatures between 0 and -40°C in the Gekstaller station, whereas they varied between 0 and -30°C in the PT1, as this location is in higher latitudes. In addition, the model was able to represent the seasonality of temperature in the simulated points. The layer 1 in PT1 obtained lower Air Temperature values in relation to the other layers, which led to a greater Sea Ice Thickness in layer 1. As main conclusion, the punctual model showed stability, with no great variations in the Sea Ice Thickness in the five layers. At the Gekstaller point, which is characterized by a permanent ice layer, the simulations did not show great changes in the Sea Ice Thickness. This occurs because snow serves as an insulator, as indicated by the melting rate in this this region lower than the deposition rate.