Introducing Argentina Naval Hydrographic Service (SHN) Antarctic Sea Ice Forecast

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In recent months, the Argentine Naval Hydrographic Service has introduced a new product to its web page (http://www.hidro.gob.ar/smara/sb/sb.asp#): 3-months forecast of Antarctic sea ice (SI) concentration and anomalies of SI concentrations fields forecast together with surface air temperature, surface pressure and precipitation anomalies forecast for South America. The forecast is based on two modes of Principal Components Analysis (S- and T-Mode) applied to SI. The S-Mode that is applied to SI series, gives patterns of temporal series with validity areas. These series are important to determine which areas in Antarctica will have positive or negative SI anomalies based on what happen in the atmosphere. And, T-Mode Principal Components Analysis applied on SI fields gives us the form of the SI fields anomalies based on a classification of 16 patterns. Each pattern has a unique atmospheric fields associated to them. Therefore, it is possible to forecast whichever atmosphere variable we decide for the Southern Hemisphere. When the forecast is obtained, each pattern has a probability of occurrence and sometimes it is necessary to compose more than one of them to obtain the final result. S-Mode and T-Mode are monthly updated with new data, for that reason the forecasts improved with the increase of cases. We use the Monthly Polar Gridded Sea Ice Concentrations database derived from satellite information generated by NASA Team algorithm provided monthly by the National Snow and Ice Data Center of USA that began in November 1978. Recently, we have been experimenting with multilayer Perceptron (neuronal network) with supervised learning and a back-propagation algorithm to improve the forecast. The Perceptron is the most common Artificial Neural Network topology dedicated to image pattern recognition. It was implemented through the use of temperature and pressure anomalies field images that were associated with a group of sea ice anomaly patterns. The variables analyzed included only composites of surface air temperature and pressure anomalies to simplify the density of input data and avoid a non-converging solution. The obtained results are encouraging. We consider that this tool will be important for other scientist around the world to prepare they own Antarctic campaigns to several regions in Antarctica.