The impact of SST on the weather forecast quality in the Bulgarian Antarctic Base area on Livingstone Island

Boriana Chtirkova and Elisaveta Peneva
Sofia University, Faculty of Physics, Department of Meteorology and Geophysics, Bulgaria (bshtirkova@uni-sofia.bg)

The weather forecast of good quality is essential for the humans living and operating in the Bulgarian Antarctic Base. The numerical weather prediction models in southern high latitude regions still need improvement as the user community is limited, little test cases are documented and validation data are scarce. Not lastly, the challenge of distributing the output results under poor internet conditions has to be addressed.

The Bulgarian Antarctic Base (BAB) is located on the Livingstone Island coast at 62°S and 60°W. The influence of the Southern ocean is significant, thus important to be correctly taken into account in the numerical forecast. The modeling system is based on the WRF model, configured in three nested domains down to 1 km horizontal resolution, centered in BAB. The main objective of the study is to quantify the Sea Surface Temperature (SST) impact and to recommend the frequency and way to perform measurements of the SST near the base. The focus is on prediction of right initial time and period of “bad” weather events like storms, frontal zones, and severe winds. Several test cases are considered with available measurements of temperature, pressure and wind speed in BAB during the summer season in 2017. The numerical 3 days forecast is performed and the model skill to capture the basic meteorological events in this period is discussed. Sensitivity experiments to SST values in the nearby marine area are concluded and the SST influence on the model forecast quality is analyzed.