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Poster.4: . Evaluating the impact of WRF-3DVAR assimilation for weather forecasting in the Ander: The case of the Antisana glacier in Ecuador

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Abstract

The topographic complexity, coupled with insufficiently monitored atmospheric processes, the lack of knowledge of optimal sub-grid parameterizations, and the sensitivity of models to initial conditions, make weather forecasting for water resource management and risk assessment difficult. Data assimilation either from synoptic, radiosonde, or satellite data is used to improve the initial conditions for running regional weather models. This study evaluated the performance of the WRF model using three assimilation scenarios: radiosondes, weather stations, and both over the Antisana glacier in the northeastern Andes, which supplies drinking water to the south of Ecuador's capital, Quito. The scenarios were compared with forecasts without assimilation schemes, and observations from weather stations in the glacier area. Forecasts were evaluated from 1-3 days, for two time periods in November 2019, and January 2020. The results shown that the forecasts with assimilation were not accurate in November, the variables' behavior is mostly irregular and does not reflect the conditions of the area. In January, assimilation produced a positive impact on temperature forecasts, and it managed to reduce the underestimation of accumulated precipitation, but still shows drawbacks in short-term events. A simple synoptic analysis revealed that January forecasts gave better results because winds have more synoptic characteristics, and they have fewer local influences than those shown in November.