



Impact of topographic aggregation on atmospheric regional models in Patagonia

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It has been agreed that topographic aggregation is an important driven variable in Foehn wind effects modelling because the topography is often smoothed at low resolution in climate models. Topographic aggregation consists of a discretization of the altitudes from a high-resolution Digital Elevation Model (DEM) to a lower resolution model grid. Most current General Circulation Models (GCM) and Regional Climate Models (RCM) use topographic aggregation methods unable to reproduce small-scale topographic variability such as mountain ridges or valley bottoms. The aim of this study is to compare different methods of topographic aggregation in climate models and evaluate their impacts on simulated precipitation by MAR, an RCM specifically developed for polar regions. This study focuses on the Patagonian region, where strong Foehn events are observed between the western and eastern coast. In situ observations are used to evaluate the best aggregation method of the DEM used in MAR to represent the topography at low resolution with the aim of improving the representation of Foehn effects. This study serves as a recommendation for a better representation of these events to existing RCMs and, albeit to a lesser extent, to GCMs.