



## **Quantifying the uncertainty in model-based estimates of Antarctic surface mass balance**

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Regional climate model simulations of the surface mass balance of the ice sheets of Antarctica and Greenland have steadily improved over the past decade. In order to use model results for the estimation of the over-all mass balance, the model uncertainty must be evaluated, for which no standard method exists. We have developed and applied a method to calculate area-averaged errors for modelled variables to two model-based surface mass balance (SMB) maps of Antarctica using in situ observations. Errors are assigned both to observations and model output, using the condition that the differences between predicted and observed SMB are normally distributed. In order to average SMB errors over ice drainage basins, the autocorrelation distance is obtained from the decorrelation length of model deviations. Using this method, relative errors in Antarctic drainage basin mean SMB are obtained that range from 10% for large and arid basins to 30% for small and wet basins.