Very high resolution surface mass balance over Greenland modeled by the regional climate model MAR with a downscaling technique

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3. Results

Model MAR (c.3.6) forced by ERA-Interim (1979-2014) at its boundaries every 6 hours.

- Simulations
  1. Sim. 1: MAR at 20km with SISVAT at 10 km (with online downscaling: Online)
  2. Sim. 2: MAR at 20km with SISVAT at 20 km (without downscaling)

- Interpolation of the 20km results onto the 10km grid (fig. 1)
  1. Interpolation by giving the value of the original pixel (20km) to the four sub-pixels (10km) (interpolation by nearest neighbour; INN)
  2. Bilinear interpolation (IB)
  3. Interpolation with an offline downscaling method based on an elevation gradient (Franzen et al., 2012; Offline)

- Validation and comparison of the results (10km and 20km interpolated results) against observations
  - MAR values are corrected by an elevation gradient to remove altitude impact

<table>
<thead>
<tr>
<th>Observations zone</th>
<th>Nearest Neighbour</th>
<th>Bilinear</th>
<th>Offline</th>
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</thead>
<tbody>
<tr>
<td>BIAS</td>
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<td>0.41</td>
<td>0.41</td>
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Fig. 3 Observations of yearly accumulation from Machguth et al. (2015), in comparison with the interpolated results using online and offline downscaling methods. (a) Nearest neighbour (INN) (b) Bilinear interpolation (IB) (c) and the interpolation of Franco et al., 2012 (Offline).

Fig. 4: Surface mass balance mean (1979-2014) simulated by MAR with an online downscaling method (a). Surface mass balance mean biases between reference simulation (Online downscaling) and interpolated 20km results by nearest neighbour (INN) (b), Bilinear interpolation (IB) (c) and the interpolation of Franco et al., 2012 (Offline).

5. References


