

Comparison of remote sensing derived glacier facies maps with distributed mass balance modelling at Engabreen, northern Norway

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Abstract Calibration and validation of glacier mass balance models typically rely on mass balance data derived from measurements at individual points, often along altitudinal gradients, thus neglecting much of the spatial variability of mass balance. Remote sensing data can provide useful additional spatially distributed information, e.g. on surface conditions such as bare ice area, firn cover extent, or snow. We developed a semi-automated procedure to derive glacier-facies maps from Landsat satellite images, and applied it to Engabreen, an outlet glacier from the Svartisen ice cap in northern Norway. These maps, discriminating between firn, snow and ice surfaces, are then used as a reference for mass balance modelling. Facies information shows a general agreement with the available few field observations and results obtained by distributed mass balance modelling. We conclude that Earth Observation products provide a powerful, although as yet poorly exploited tool, for calibration and validation of distributed mass balance models.

Key words Engabreen; glacier facies; glacier mass balance; Landsat; modelling; Norway; remote sensing
