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# A new glacier inventory for the Svartisen area (Norway) from Landsat ETM+: Methodological challenges and first results

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Glacier changes in Norway were subject to a considerable regional variability in recent decades. However, the last glacier inventory for northern Scandinavia has been compiled more than 30 years ago and the current glacier state is thus not well known. Within the framework of the GLIMS project, the NVE has decided to create a new glacier inventory from Landsat data. Although the techniques for automated glacier mapping and the GIS-based data processing are well established and straight forward, the assessment of glacier changes with respect to a former inventory poses several challenges. One is the delineation of glacier basins (ice divides) from the former inventory that do not match with current digitally available hydrologic divides. The 'artificial' area changes caused by the different divides were often several times larger than the real area changes. Another challenge are glaciers that have not been identified in the former inventory and require a new code. Hence, we have decided to create two new inventories, one with the old ice divides to assess changes per glacier and one with new basins and additional codes for the GLIMS database. A further more general problem is dedicated to seasonal snow that covers possible glaciers. While manual delineation helped to exclude snow patches in the ablation region of larger valley and mountain glaciers, it fails for most of the small patches without bare ice. The associated area changes are of random nature and cannot be interpreted as a climatic signal. The observed changes for the larger ice masses exhibit a considerable scatter, quite often side-by-side: From small advances to little retreat for the Vestisen ice cap and no changes to strong retreats in Ostisen, to complete disappearance for small glaciers at the glaciation limit. Our analysis confirms, that only changes that are assessed for a large sample of glaciers provide a reliable estimate of ongoing cryospheric changes

and that special care has to be taken for correct glacier delineation (ice divides, seasonal snow). In any case, the number of glaciers counted in the 1970s inventory was too small.