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DEGREE:	Philosophiae Doctor
FACULTY:	Faculty of Mathematics and Natural Sciences
DEPARTMENT:	Geosciences, Section for Geography and Hydrology
AREA OF EXPERTISE:	Earth observation, Glaciology
SUPERVISORS:	Prof. Andreas Kääb, Dr. Paul Leclercq & Dr. Christopher Nuth
DATE OF DISPUTATION:	16th of May 2018
DISSERTATION TITLE:	*Observing change in glacier flow by using optical satellites / Optiske satellitter observerer endringer i isbevegelse*

Ved hjelp av satelitter og ny teknologi kan hastigheten til isbreer nå måles automatisk fra verdensrommet. Det er stor variasjon i bevegelser til isbreer, og i avhandlingen er det utviklet løsninger for å kunne sammenligne forskyvninger over tid. Det betyr at flytdynamikken i breene kan oppdages i nær sanntid på store områder slik som en fjellkjede.

In the last couple of years many Earth observation satellites with optical instruments have been set in space. These satellites generate an enormous amount of data and give us a image of different landforms on Earth. The data are available for researchers in Earth Science, though efficiently transforming this imagery data to glaciological information has been a challenge.

The work in this dissertation presents modern day techniques to extract glacier velocity information from the satellite imagery. Now it is possible to extract reliable displacement measurements from any satellite independent of its flight path. In this way extracting reliable decadal changes of glacier velocity is finally possible. Moreover, by recent development in technology and clever algorithms developed in this PhD work, extracting short term velocity changes are one of the possibilities. So the timing of sliding of a glacier due to melt water can be observed and located. Lastly, methods for data reduction of big data volumes are exploited to develop a discovery tool that is able to observe glacier dynamics over several large mountain ranges.

This research might be the first step towards transforming large data volumes into useful information for worldwide glacier monitoring. The PhD work was a part of the ERC Advanced Grant project 'Global Glacier Mass Continuity (ICEMASS)'.