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| **DOCTORAL CANDIDATE:** | Guillaume Sauvin |
| **DEGREE:** | Philosophiae Doctor |
| **FACULTY:** | Faculty of Mathematics and Natural Sciences |
| **DEPARTMENT:** | Geosciences |
| **AREA OF EXPERTISE:** | Geophysics |
| **SUPERVISORS:** | Isabelle Lecomte, Sara Bazin, and Louise Hansen |
| **DATE OF DISPUTATION:** | 7th of April 2014 |

**DISSERTATION TITLE:** *Integrated geophysics for mapping of quick-clay landslide-prone areas in Norway.*

Quick clay is a known hazard in formerly-glaciated coastal areas (Scandinavia and Canada), and significant efforts are being taken to map their occurrence and extent. Quick-clay landslide prone areas are usually investigated only by geotechnical means, but recently, considerable efforts by a number of researchers have been made to investigate areas of sensitive clay using a range of geophysical techniques. These studies aimed to develop techniques to maximize the use of non-intrusive geophysical surveys to complement localized geotechnical investigations.

Following a thorough review of the physical properties of quick clays, we evaluated the potential of geophysics for quick-clay investigation in order to find a suitable, integrated and multi-disciplinary approach to improve our possibilities to accurately identify its occurrence and map its extent both vertically and laterally. Using a number of case studies, we demonstrate how geophysics can contribute to better investigate sites prone to quick-clay landsliding and advantageously complement geotechnical localized 1D soundings by providing detailed stratigraphic and quantitative information in 2D and 3D. Since geophysics does not directly provide the necessary parameters for quick-clay characterization, one as to link geophysical parameters to geotechnical ones through, e.g., empirical correlations. The potential correlations between geotechnical and geophysical parameters were also explored in the study.

Finally, we show how the geological model resulting from geotechnical and geophysical data integration can be used for landslide site characterization and stability assessment. This PhD project was carried out within the Department of Geosciences and in collaboration with NORSAR.