Seasonal changes in stream bank stability under different vegetation cover

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Several complex interactions occur between riparian vegetation and bank stability processes. The principles of slope stabilization by vegetation are well known: vegetation effects on slope stability may be broadly classified as either hydrological (altering soil moisture) or mechanical (root reinforcement against hydraulic and mechanical shear stresses). The quantification of coupled hydrological and mechanical effect of vegetation on bank stability remains difficult due to the complexity of the interactions occurring between riparian vegetation and processes of bank stability. The relative effect changes throughout the year as the weather condition, soil moisture status, and the growth cycle of vegetation cover, including development of roots system.

There is very limited amount of field scale research focusing on investigation of coupled hydrological and mechanical influence of vegetation on stream bank behaviour, accounting for both seasonal time scale and different vegetation type, and none dedicated to marine clay soils (typically soil for Norway). We aim to investigate both hydrological and mechanical effect of vegetation on stream bank stability in the agricultural catchment in Norway. We combine seasonal hydrological monitoring with stream bank stability modelling in order to identify critical periods for stream bank stability and their dependence on vegetation cover type (grass, shrubs and trees).

Herein we will present observed hydrological trends and differences between three cross – sections as well as corresponding simulated stream bank stability variations(BSTEM model).