The *MYR* Project (2018-21): Climate smart management practices on Norwegian organic soils

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1. Background

- The European Union has proposed a climate target for Norway to reduce emissions from sectors outside the EU Emissions Trading System by 40% by 2030, over 2005 levels, among which agriculture plays an important role;
- Cultivated organic soils (7-8% of Norway's agricultural land area) are economically important sources for forage production in some regions in Norway;
- The mitigation measures of GHG emissions at cultivated organic soils are still contentious and their applicability to Norwegian conditions are largely unknown;

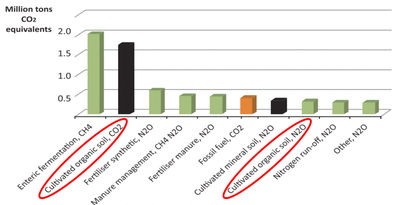


Figure 1. GHG emissions from Norwegian agriculture in 2011 (*KILF, 2013*)

2. Scope of MYR Project

- Producing the first Norwegian dataset from organic soils where emissions of all GHG's are accounted for;
- Investigating the climate mitigation of different management practices (e.g. WTL control, fertilization strategies and tillage intensity);
- Experimental data covering the broad Norwegian climate range. Study sites in subarctic, continental and temperate, coastal regions;
- Modelling and predicting the potential GHG mitigation by 2030 and 2050 with optimal management practices under different scenarios;

3. Scientific Implications

- Generating useful information for recommendations on climate-friendly management of Norwegian peatlands for both policy makers and farmers;
- Estimation of emissions and their potential reduction as well as impacts on yield by 2030 and 2050;

4.2 Approaches – Experiment Design

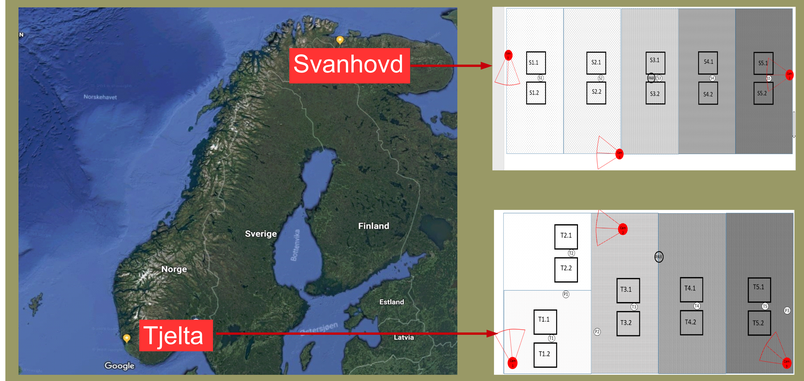
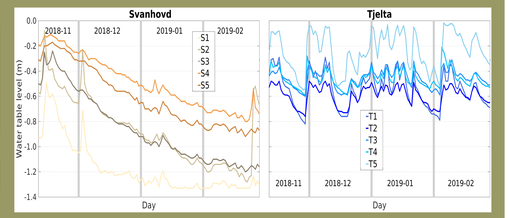
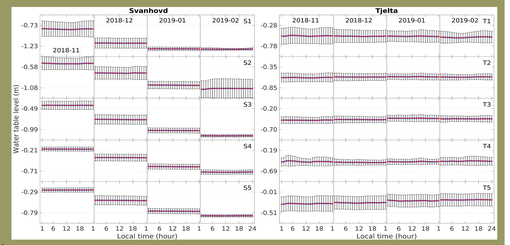


Figure 4. Experiment design in 2 sites





(1) Measurements: CO_2, CH_4, N_2O flux;
WTL, soil moisture;
biomass, grain yield, LAI;
(2) Management practices
WTL: low high;
fertilization: conventional lower;
impact of tillage : measurements after tillage and during long-term establishment;

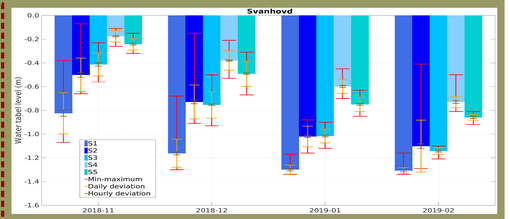


Figure 5. Observed water table gradients from 2018-11 to 2019-02

4. Approaches

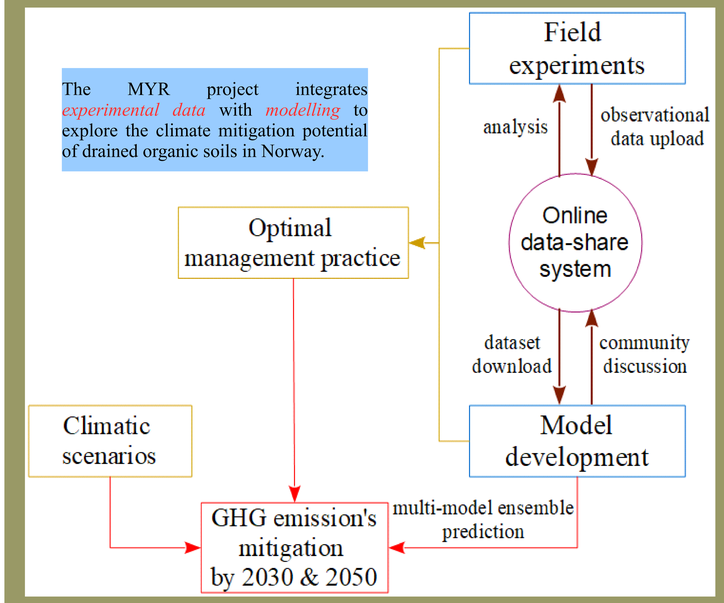


Figure 2. The general research routine of MYR project

3.1 Online Data System

- Real-time upload of observational data;
- Visualization of historical data;
- Post processing of data for modellers;
- Discussion and notification among project group;

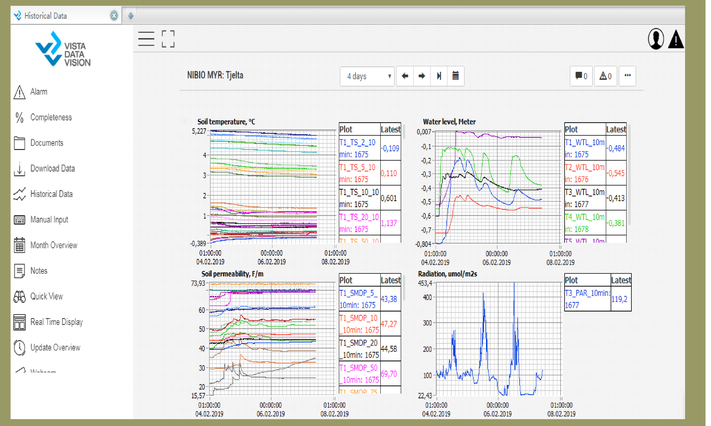
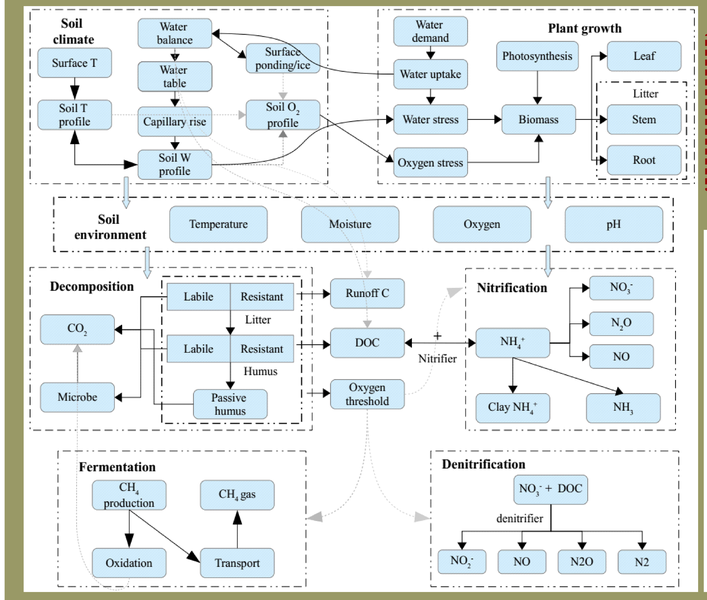


Figure 3. Visualization of historical data stored on the system

4.3 Approach - Model Development



- Developing four models individually for peatland;
- Performing multi-model ensemble predicting under different scenarios and management practices;

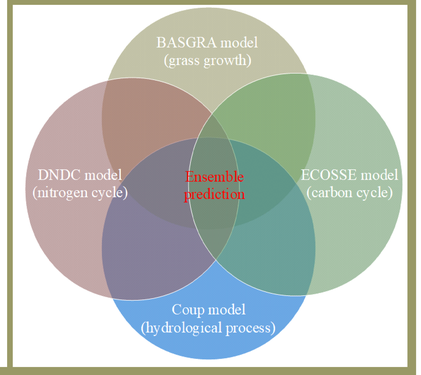


Figure 6. (a) Key biogeochemical processes for model development; (b) multi-model ensemble prediction;