Modeling present and future hail damages to crops in Switzerland

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Motivation

Hail remains the most costly natural hazard for agriculture in Switzerland. In the extreme hail year 2021, over 85% of insured agricultural losses were caused by hailstorms in June and July. These direct losses of CHF 115.6 M represent more than 2x the collected premium, 6% of the sum insured, and roughly 3% of the value of Swiss crop production.
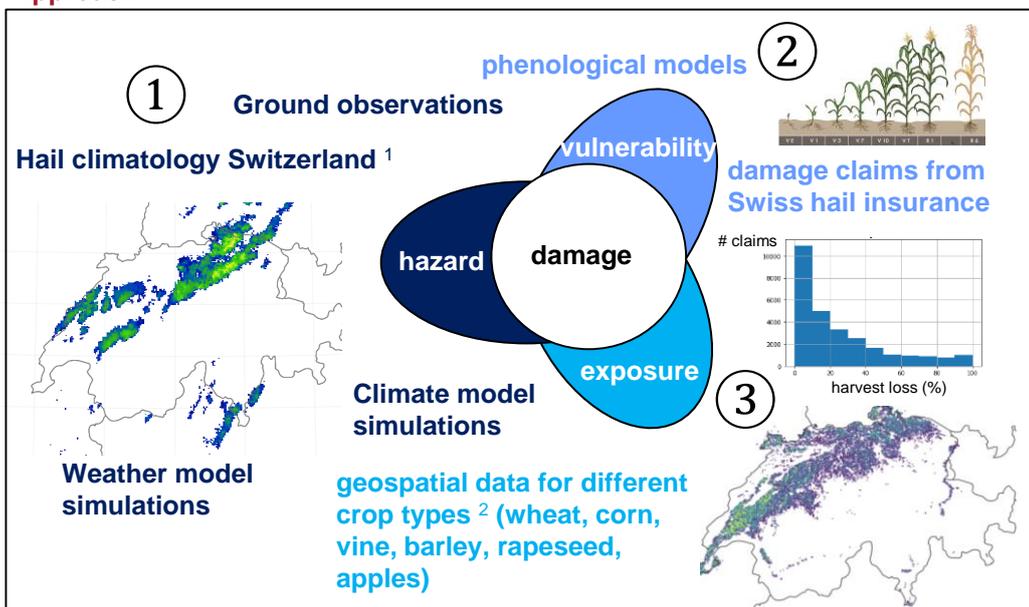
Objective

We aim at a Swiss-wide quantification of hail damages to several main crops in present and near future climate.
To this end, we use and extend the modeling platform CLIMADA and incorporate a unique combination of data sources.

Challenges

① How well do available hazard variables represent hail at the ground and are they sufficient to properly quantify damage?

② How can we account for the varying vulnerability of crops with phenological stage?

③ How can we use damage claims of insured crops fields to assess damages to all crop fields?

Approach

CLIMADA [3]
open-source damage modeling platform

• Post-hazard assessments
• Impact-based forecasts
• Present and future damage climatologies
• Economic appraisal of adaptation strategies
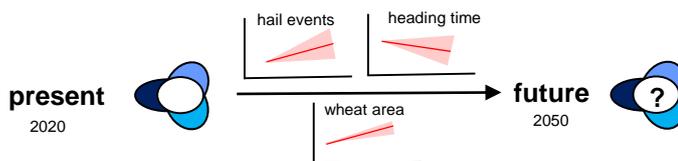
Stakeholder engagement

Figure 2: Damaged ear (wheat)

Figure 3: Damaged leave (corn)

This project is part of the transdisciplinary SNF Sinergia project «scClim», which combines expertise in complementary areas to establish a seamless model chain from the simulation of thunderstorms to the quantification of hail damages to agriculture and infrastructure in Switzerland.

References

[1] Hail Climatology Switzerland Project Team (2021): Swiss Hail Climatology. National Centre for Climate Services. doi: 10.18751/Climate/Griddata/CHHC/1.0
[2] Swiss federal office for agriculture, Geobasisdaten Landwirtschaftliche Kulturflächen
[3] Bresch, D. N. and Aznar-Siguan, G., 2021: CLIMADA v1.4.1: Towards a globally consistent adaptation options appraisal tool, Geosci. Model Dev., https://doi.org/10.5194/gmd-2020-151

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