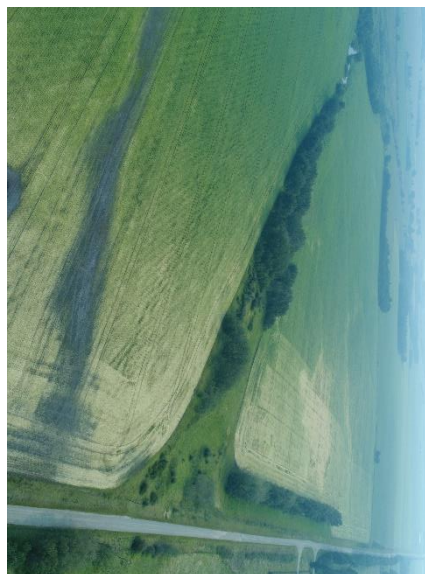


## Is it possible to detect hail damage in cropland with Sentinel-1 SAR data?

With Sentinel-1 SAR data we have a guaranteed time-series. This is essential if we want to see the changes after an event in cropland. The following example shows the result of an UAV (unmanned aerial vehicle) flight in Alberta/Canada. It shows loss zones in a barley field after a hail event.

The image on the right shows a plot divided by a small stream and some bushes. In the northern part is a small lake. The areas in the southern part that appear bright are damaged.



The same plot we see on the left in Bing Maps. Now in a cartographic projection. The division of the quarter section by a small ditch can be seen clearly. In the south there is a row of trees parallel to the road and opposite of the entrance to another farm.

On the left side in north-south direction is a wet area, which appears as well in both images.

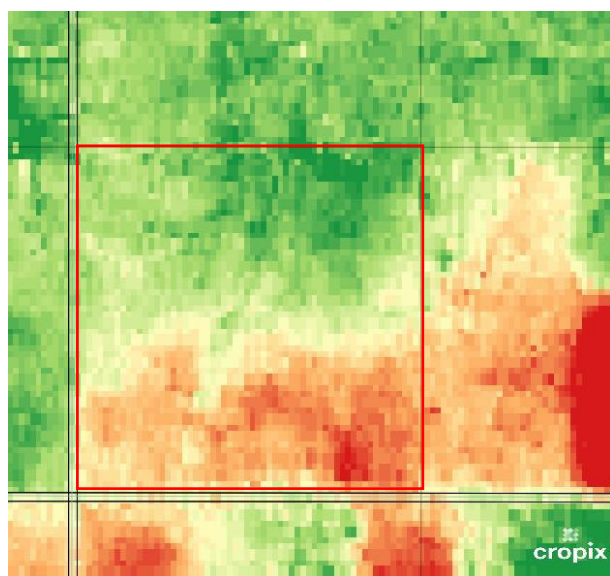
If we look now on the **change map** derived from Sentinel-1 ESVI, we see patterns that clearly correspond with the UAV flight result above.

The destruction caused by the hail took place in the southern part with an increasing intensity in the south-western part.

When we measure the change we have to consider that we might have antagonistic dynamics within those 12 days.

While there was an influence caused by the hail, the normal growth or maturity still continues.

Obviously the change in terms of ESVI units is stronger, in plots with dense fresh biomass.



Plots with lower biomass contents will not change so clearly. But loss in terms of yield reduction is independent from the biomass and the phenological stage. We still need to inspect the fields and quantify the loss ratio. The satellite data will help to guide the loss adjusters. It is cheap and world-wide available. We can classify the area into zones and aggregate the hectareage of those loss zones. But it will not work for all crops and all stages. Still it can be very useful to support loss assessment in planning, guidance, quantifying the hectareage, producing repeatable results and transparency.