Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
Agroscope
Agroecology and Environment (AOU)

Chloé Wüst-Galley | 11th November 2019

Revised uncertainty associated with the surface of organic soils

A description of the revision of the uncertainty of organic soils in Switzerland, based on a revision of the Federal Inventory of Fens of National Importance and the revised data sets pertaining to fens of regional and local importance.

The surface of organic soils in the Swiss greenhouse gas inventory is based on a map published by Wüst-Galley et al. (2015) and is estimated to be 27,813 ha. The map is a compilation of various information sources relating to soil, vegetation and geology, as well as past evidence of peat. The overlaying of various information sources resulted in surfaces which had different 'strength of evidence' that they represent an organic soil surface (Wüst-Galley et al. 2015, pp. 43, 45-47). Since the publication of the organic soils map, a revision of the fen inventory has been carried out[1] by the Federal Office for the Environment; the associated data, including fens of national, regional and local importance (the latter two obtained as part of the inventory, though not forming part of it), were obtained for use in Switzerland's greenhouse gas inventory.

The incorporation of the revised fen inventories into the organic soil map is complicated by a change in the information gathered during the survey. In the previous inventory, each fen was divided into sections, and the cover of each of seven vegetation types was determined

1 Verordnung über den Schutz der Flachmoore von nationaler Bedeutung (Flachmoorverordnung) SR 451.33: https://www.admin.ch/opc/de/classified-compilation/19940213/index.html in German, French and Italian

Agroscope
Chloé Wüst
Reckenholzstrasse 191, 8046 Zürich / Switzerland
T: +41 58 466 77 74, F: +41 58 468 72 01
chloe.wuest@agroscope.admin.ch
www.agroscope.ch | good food, healthy environment

to the nearest 10 % for each fen section. Three of these vegetation types were deemed peat-building by Wüst-Galley et al. (2015, pp. 17-18). The detailed characterisation of the vegetation meant each fen section could be designated as organic soil or not, by applying a threshold: a fen section containing ≥ 80 % peat-building vegetation was considered to be organic soil. The characterisation of the fen vegetation in the new inventory is much less detailed. Firstly, the fens are no longer divided into sections, and secondly, only the presence / absence of each vegetation type per fen is recorded, not its cover. These changes preclude the use of the results from the new inventory to estimate the presence of organic soil.

The revised inventory can however be used to improve the uncertainty estimate of the organic soils, as documented here. The upper estimate of the surface of organic soils is currently calculated as the sum of i) all surfaces for which there is historical evidence of peat, but no modern evidence (= categories VI and VII from Wüst-Galley et al. 2015, pg. 43) and ii) half of the surfaces for which there is "no ambiguous evidence of peat" but for which an organic soil is possible (= category VIII from Wüst-Galley et al. 2015, pg. 43), accounting for evidence of mineral soils in forests categories. This upper estimate is subsequently divided by the estimate of the organic soil surface to yield a relative error estimate, assumed to correspond to the upper limit of the 99th confidence interval. This is further converted to the error estimate corresponding to the 95% CI.

A new estimate of the uncertainty of organic soils was calculated by improving the upper estimate (only) of the organic soil surface. This was carried out by expanding the category of surfaces "no ambiguous evidence of peat", incorporating the revised fen inventory surfaces as follows: Fens from the 2017 revised inventory containing any i) peat-building vegetation (see above), or ii) Caricion davallianae, Magnocaricion, or Phragmition vegetation were selected. The latter three vegetation types were classified by Wüst-Galley et al. (2015, pp. 17-18) as being potentially peat-building but representing "no ambiguous evidence of peat", and were used in the previous uncertainty estimate. In total, this surface sums to 27,284 ha.

This is a very large surface (the whole revised fen inventory comprises 27,541 ha), a direct result of the imprecise characterisation of vegetation, as described above. The 27,284 ha were overlain with the map of organic soils, accounting for information on mineral soils in forests. Additional surfaces (only) created by the incorporation of the 2017 fen inventory were added to the category “no ambiguous evidence of peat”. The original uncertainty calculation (see above) remains otherwise unchanged.

The maximum estimate of organic soils has increased from 58,953 ha to 65,737 ha. The lower estimate of the organic soil surface (18,066 ha) remains unchanged.

References:
Wüst-Galley, C., Grünig, A. and Leifeld, J. (2015) Locating Organic Soils for the Swiss Greenhouse Gas Inventory. Agroscope Science 26: 1-99.