

Impact of forestry on acidification of soils

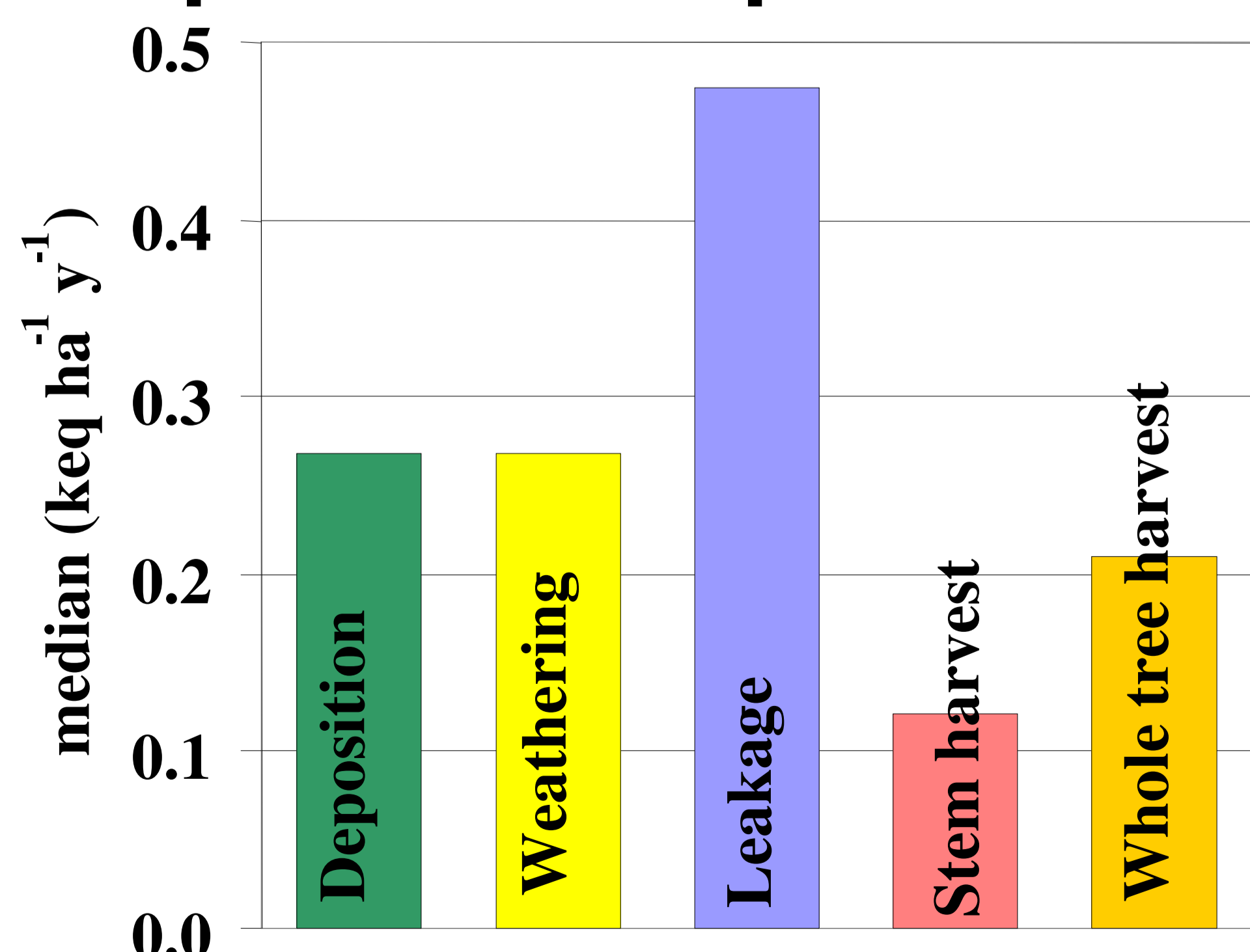
Background

The atmospheric deposition of sulphur and nitrogen during the last 50 years has caused a significant acidification of forest soils in a large part of Sweden. Harvest in managed forests is also a source of soil acidification. When the acid deposition decreases the forestry will be relatively more important for recovery and future acid-base status of forest soils.

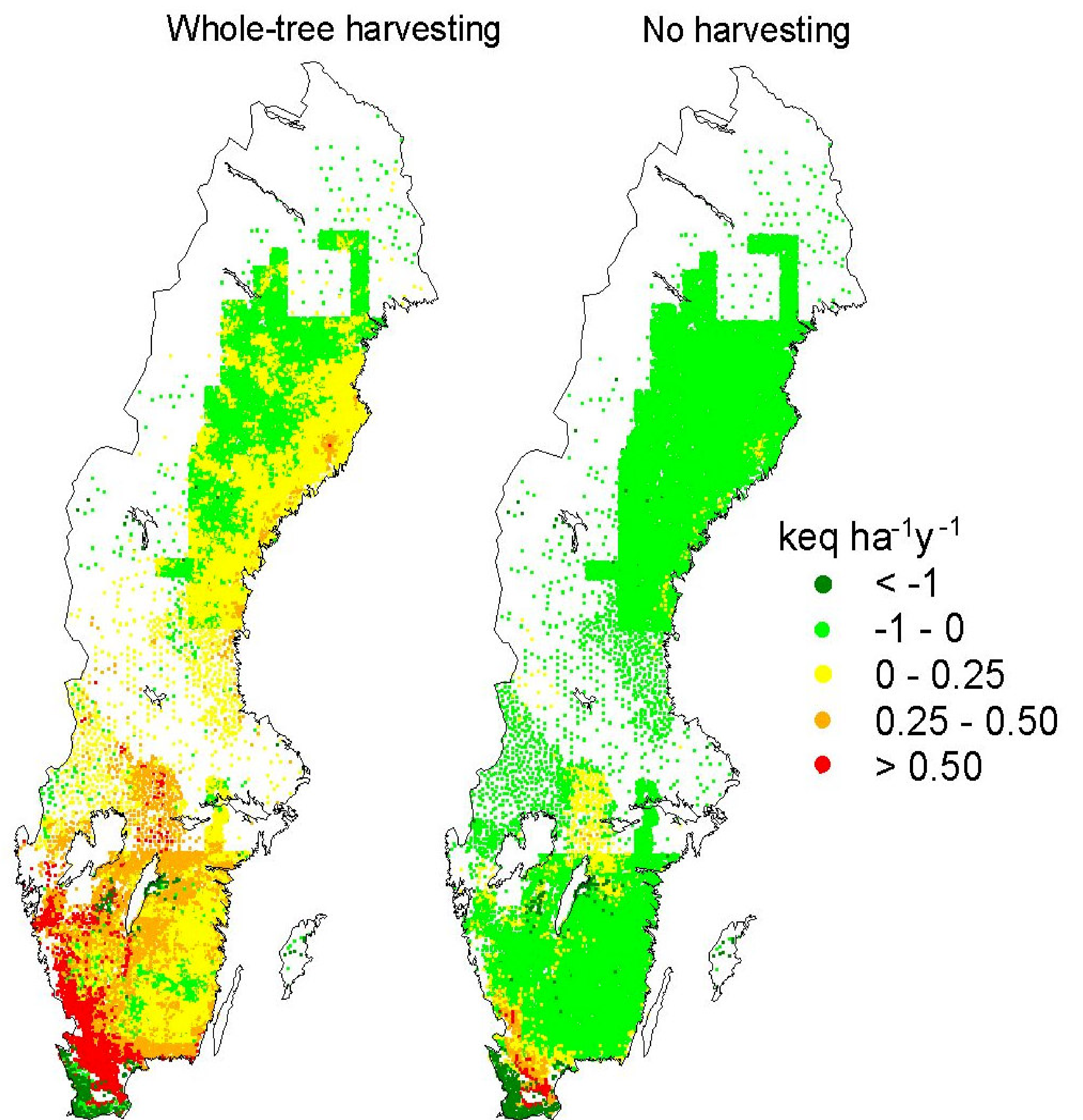
Comparing the effects from deposition and forestry

Deposition and weathering of base cations is naturally almost balanced by leakage in Sweden and the space for harvest, without causing net losses, is limited (see Figure below). Practically possible whole tree harvest almost doubles the losses, compared to stem harvest. The uptake of base cations in trees is acidifying, but the uptake of N counteracts most of the potential acidification from deposited N in Sweden, which should be taken into account when assessing the net effect from forestry. The acidifying effect of the harvest is possible to counteract by compensatory fertilization, e.g. with limestone and wood ash.

Inputs and outputs in Sweden



Exceedance of critical load



Conclusions

- Despite the recent decrease of deposition both air pollutants and forestry contribute to acidification, which makes recovery more difficult.
- Biological effects of acidification are mainly observed in running waters and lakes in Sweden.
- The acidification effect from forestry varies on a local and regional level due to different soil properties, forest production and harvest intensity. Compensatory fertilization is necessary in many areas.
- Harvest in forests both contribute to acidification (uptake of base cations) and counteract it (uptake of deposited N).
- The concept of critical loads is useful in separating the acidification induced by deposition and forestry since it comprises both terms, as well as the effect of N uptake. It is important to choose criteria which are relevant for the environments to protect, e.g. criteria to protect surface water in Sweden.