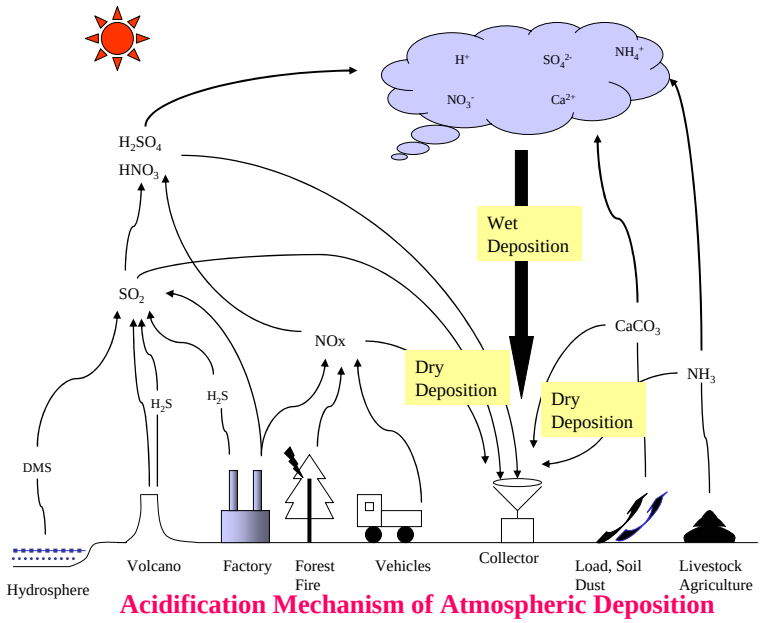
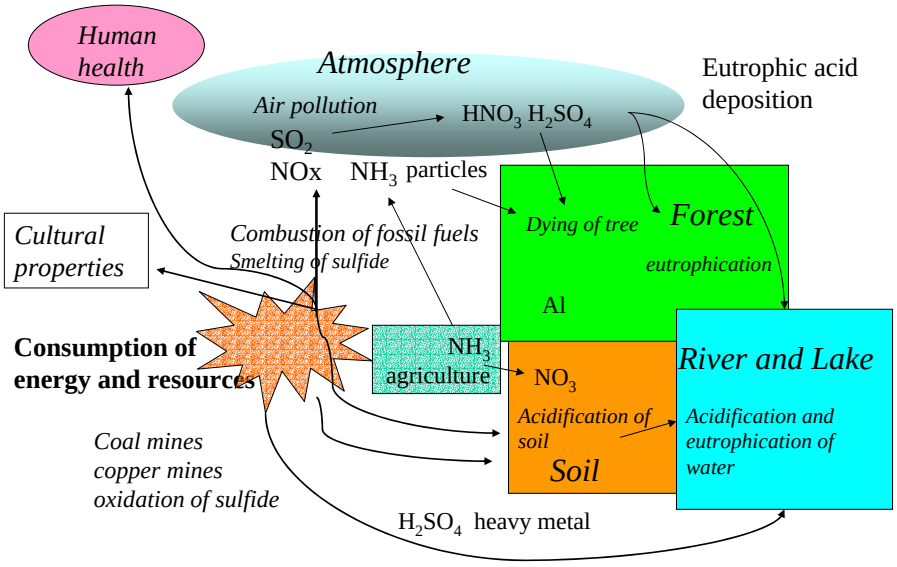
Critical Load

Acid deposition and Oxidant
Research Center



Acidification Mechanism of Atmospheric Deposition

Acid pollution and its impacts



Critical Load

- **A quantitative estimate of an exprosure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge.**

Nilsson and Grennfelt (1988), Critical Load for Sulphur and Nitrogen. Report from a workshop at Skoloster, Sweden, NORD Report 1988: Copenhagen, 418pp

Critical Load Method

1. **CL for acidity on soil** – Level Zero Method (Nilsson and Grennfelt, 1988)
2. **CL for acidity on soil** – **Simple Mass Balance Method** (Sverdrup and de Vries, 1994)
3. **CL for acidity on water** – Steady-State Water Chemistry Method
4. (cf. Sverdrup et al., 1990)
5. **CL for acidity on water** – "Diatom Model" (Hornung and Skeffington, 1993)
6. **CL for nitrogen and sulfur on soil** – **Mass Balance Method** (cf. Grennfelt and Thornelof, 1992)
7. **CL for nitrogen and sulfur on water** – First-order Acidity Balance (FAB) Method (Henriksen et al., 1993)
8. **CL for sulphur using the methods 1-4 and "sulphur fraction" approach** (Sverdrup et al., 1990)
9. **CL for acidity on soil** – Steady-State Mass Balance Method, PROFILE variant (Sverdrup et al., 1990)

- **Simple Mass Balance Method**
- $CL(acidity) = BC_{weathering} - BC_{uptake} - AC_{nitrogen} - ANC_{leaching}$

- CL: Critical Load for acidity
- BC: Base Cation = Ca+K+Mg+Na
- ANC leaching : ANC (Acid neutralizing capacity) leaching

- **Mass Balance Method**
- $CL(S) + CL(N) = BC^{*}_{deposition} + BC_{weathering} - BC_{uptake} + N_{denitrification} + N_{uptake} + N_{immobilisation} - ANC_{crit.leaching}$

- CL(S): Critical Load for Sulfur
- CL(N): Critical Load for Nitrogen
- BC: Base Cation = Ca+K+Mg+Na
- ANC *crit. leaching* : a critical ANC (Acid neutralizing capacity) leaching