

# Regional assessment on surface water acidification status

Kari Austnes

Heleen de Wit, Salar Valinia, Dick Wright, James Sample, Jaap Slootweg, Marine Nalbandyan, Jens Fölster, Julian Aherne, Tatyana Krimleva, Marina Dinu, Karin Koinig, Roland Psenner, Jussi Vuorenmaa, Jens Arle, Michela Rogora, Iveta Indriksone, Don Monteith, John Stoddard, Jakub Hruška (and others..)

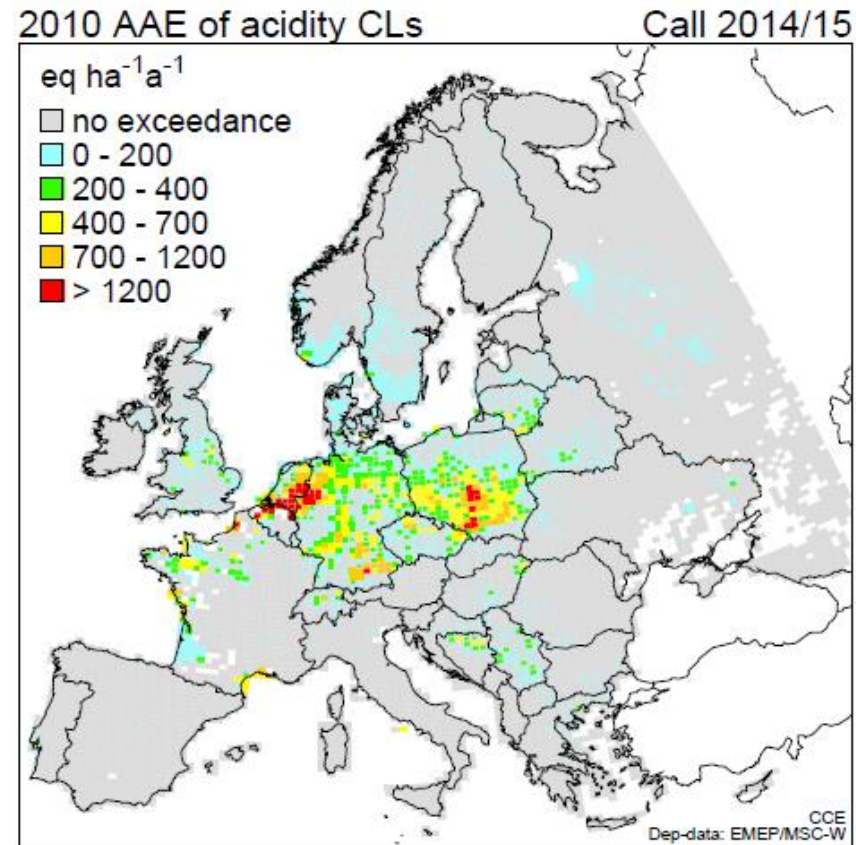
Joint ICP W and IM TF meeting 2017, Uppsala

# What do we know about the current status of surface water acidification?

- Exceedance of critical loads map
- ICP Waters database
- Maps of acid sensitive regions
- Water Framework Directive
- EEA databases
- National databases
- Other?

# Exceedance of critical loads

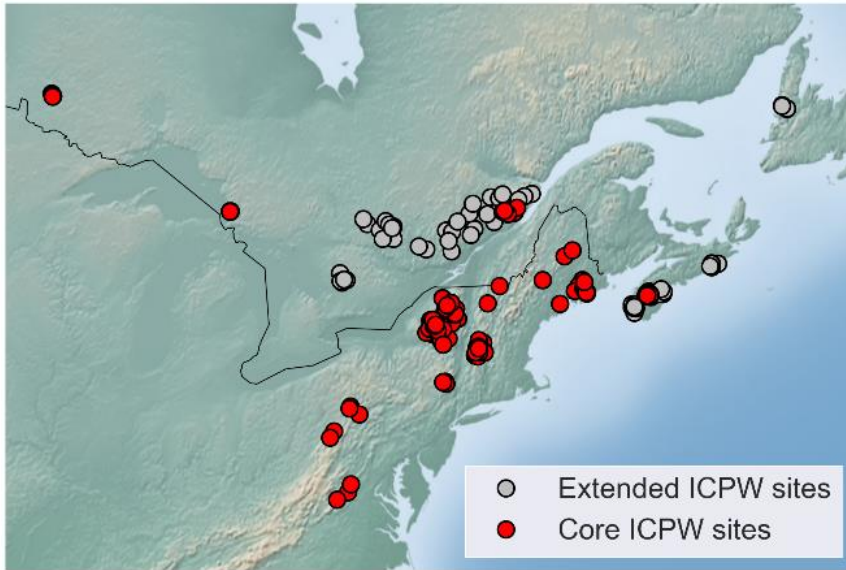
- Critical loads steady state
  - Exceedance maps do not show the current situation – delays in recovery not taken into account
- Exceedance maps represent all landscape elements
  - No specific information on water
  - CL for water can be used separately, but poor coverage



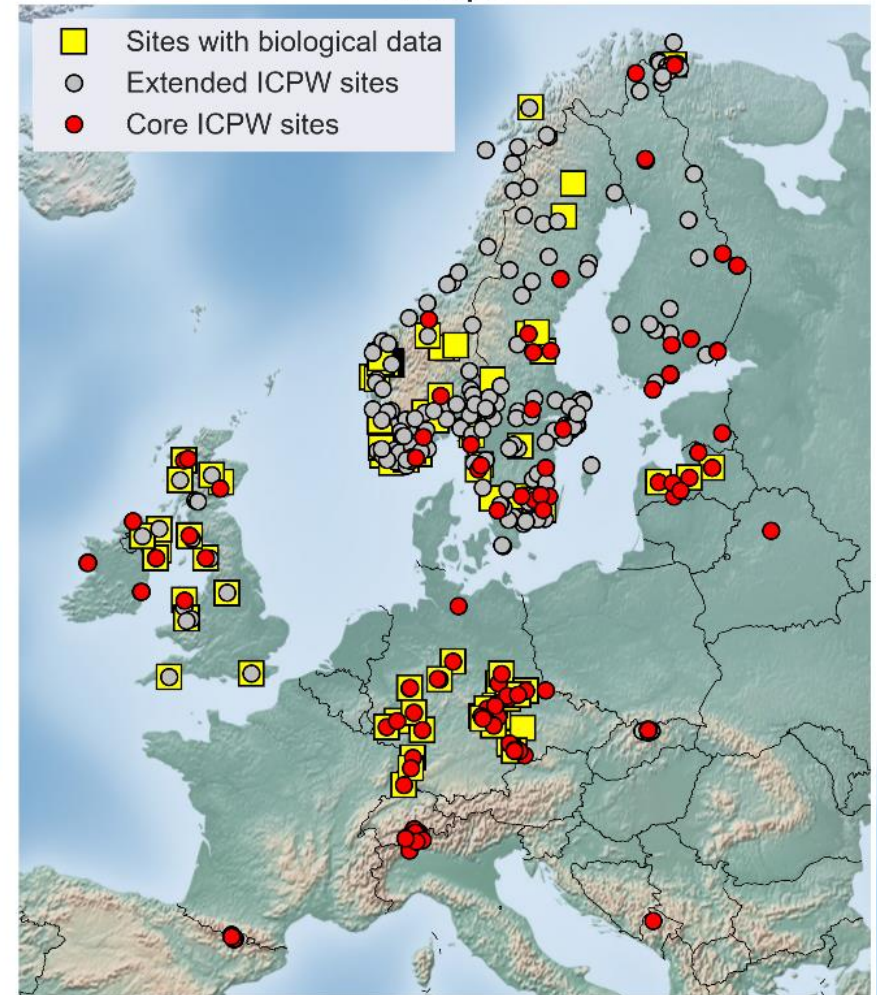
CCE Status report, 2015

# ICP Waters database

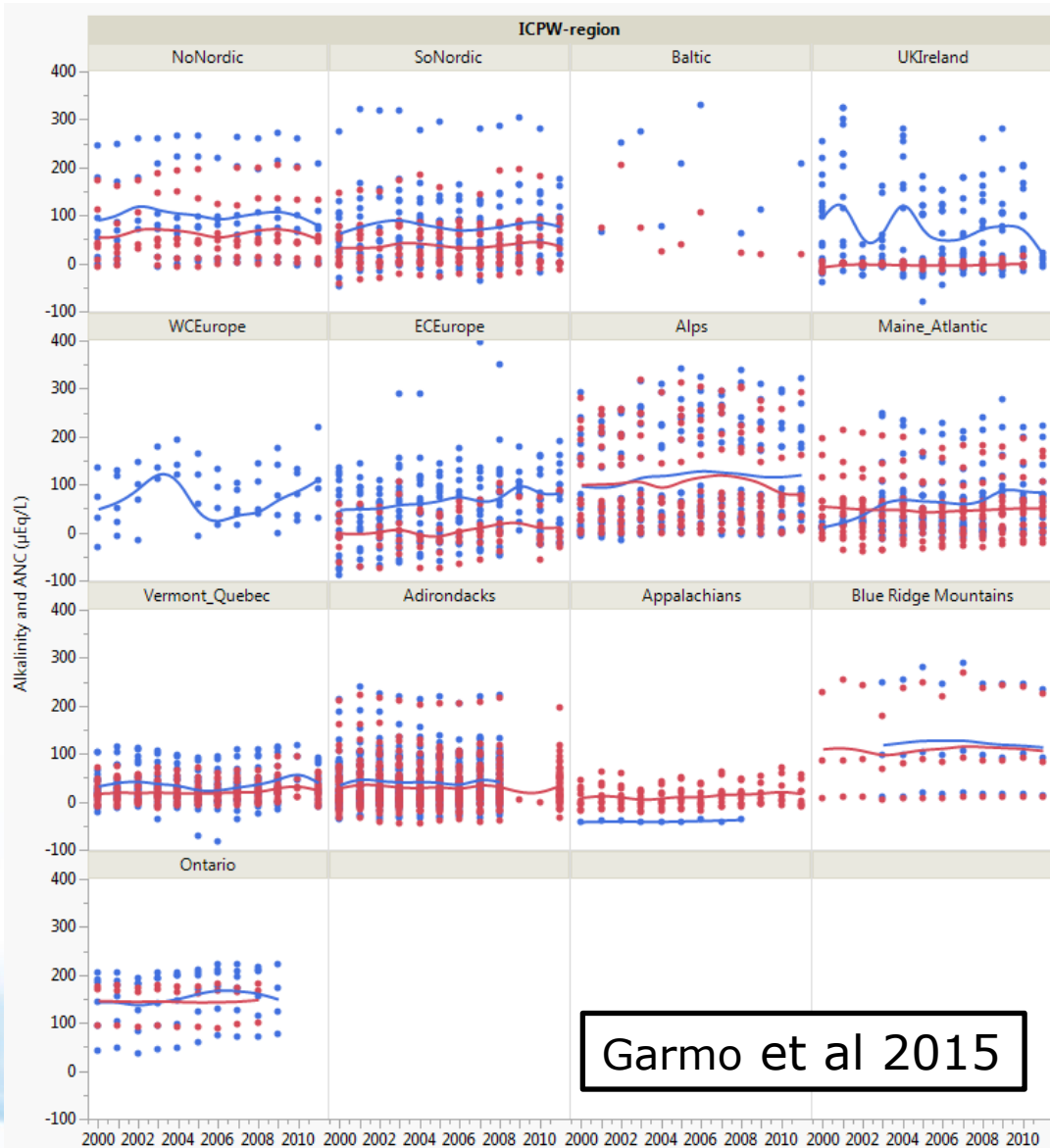
North America



Europe



# ICP Waters database: ANC by region



- ICP Waters core sites good for trend analysis
- Limited spatial coverage
- Extended sites better coverage, but not updated



# Which regions are acid-sensitive?

## Europe, based on geology

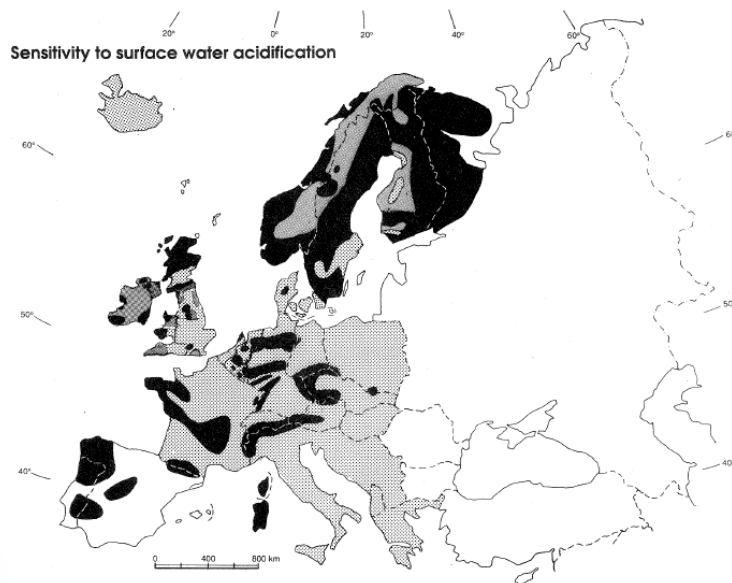
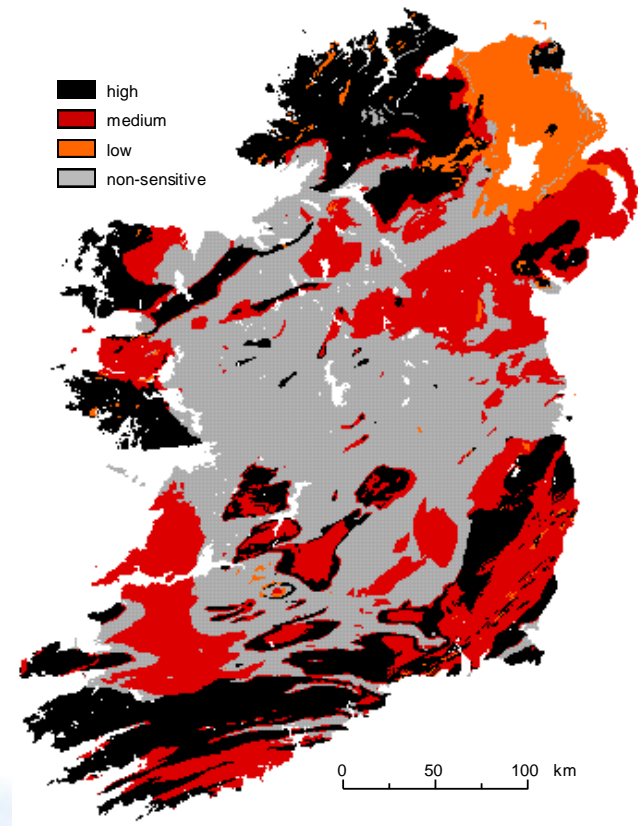


Figure 1.  
Areas in Europe sensitive to surface water acidification.  
Black : High sensitivity  
Grey : Moderate sensitivity  
Dotted: Low sensitivity  
White : Areas with inadequate or no information about the sensitivity.

Skjelkvåle&Wright, 1990

## Ireland, based on geology



From Julian Aherne

# Does acidification of surface waters remain an environmental issue?

## Data source

- Exceedance of critical loads map
- ICP Waters database
- Maps of acid-sensitive regions
- Water Framework Directive
- EEA databases

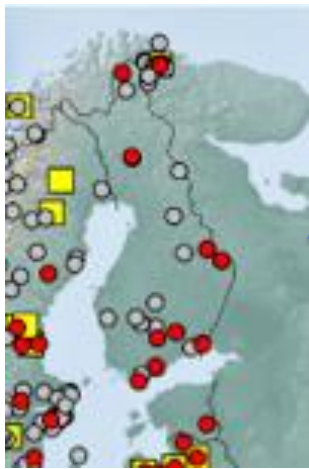
## Information

- Limited coverage; theoretical, not actual state
- High quality data but limited spatial resolution
- Illustrate that some acid-sensitive regions lack data
- No information on lakes <0.5 km<sup>2</sup>; only 'status'
- Limited coverage of relevant parameters; biological data some potential

# Objectives of this report

- *Assess the current **extent** of surface water acidification* in Europe and possibly North America.
- The assessment is intended to be a ***policy-friendly add-on*** to the assessment of exceedance of critical loads of acidity, reflecting the *present-day conditions of acid-sensitive surface waters*.
- **Target group:** Policy makers (LTRAP, NEC, others) and scientists
- **NFC contributions** important



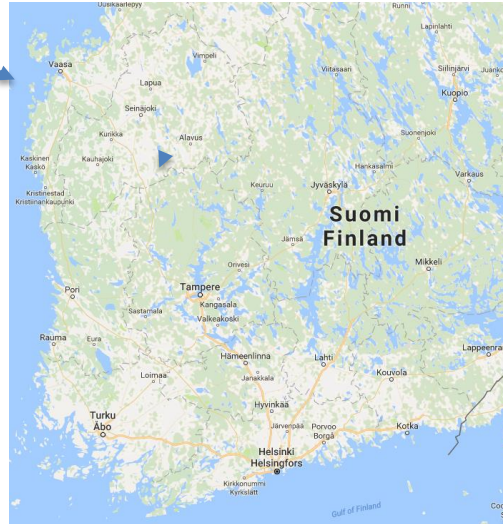


## 1. Current acidification status of surface waters from national (or other?) databases

- Define «acidified»
- Define «surface water»

## 2. Upscale to country

- Issues of representativity
- Only acid-sensitive regions?



## 3. Synthesis

- Consistency across countries?
- Policy-friendly formats

# Enquiry sent to NFCs

1. Which areas in your country are acid sensitive?
2. How do you decide if a water body is acidified?
3. National data availability?
  1. Representative surveys?
  2. Upscaling to whole area?
  3. Can you provide data/maps?
4. Is acidification status reported under the WFD?

# Summary of response

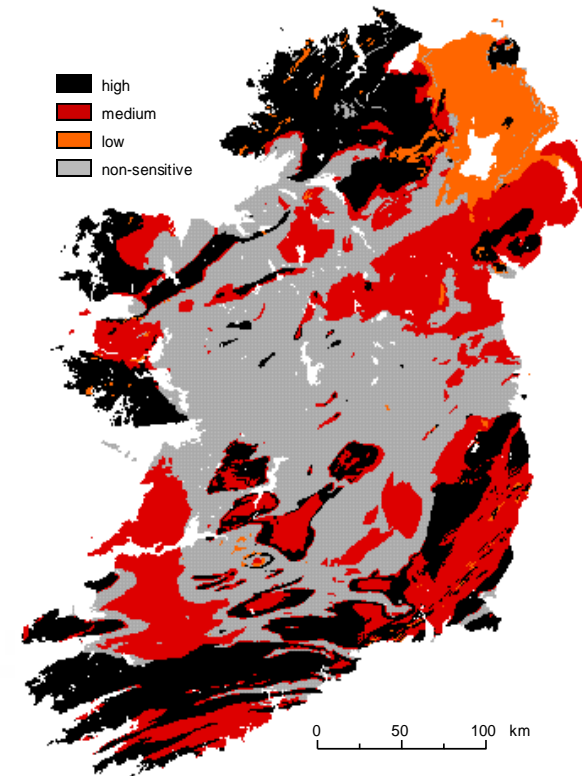
- Response from 11 NFCs – thanks!
- Content of the following slides
  - Summary response
  - Some suggestions from programme centre
- More details on Thursday

# Enquiry sent to NFCs

1. Which areas in your country are acid sensitive?
2. How do you decide if a water body is acidified?
3. National data availability?
  1. Representative surveys?
  2. Upscaling to whole area?
  3. Can you provide data/maps?
4. Is acidification status reported under the WFD?

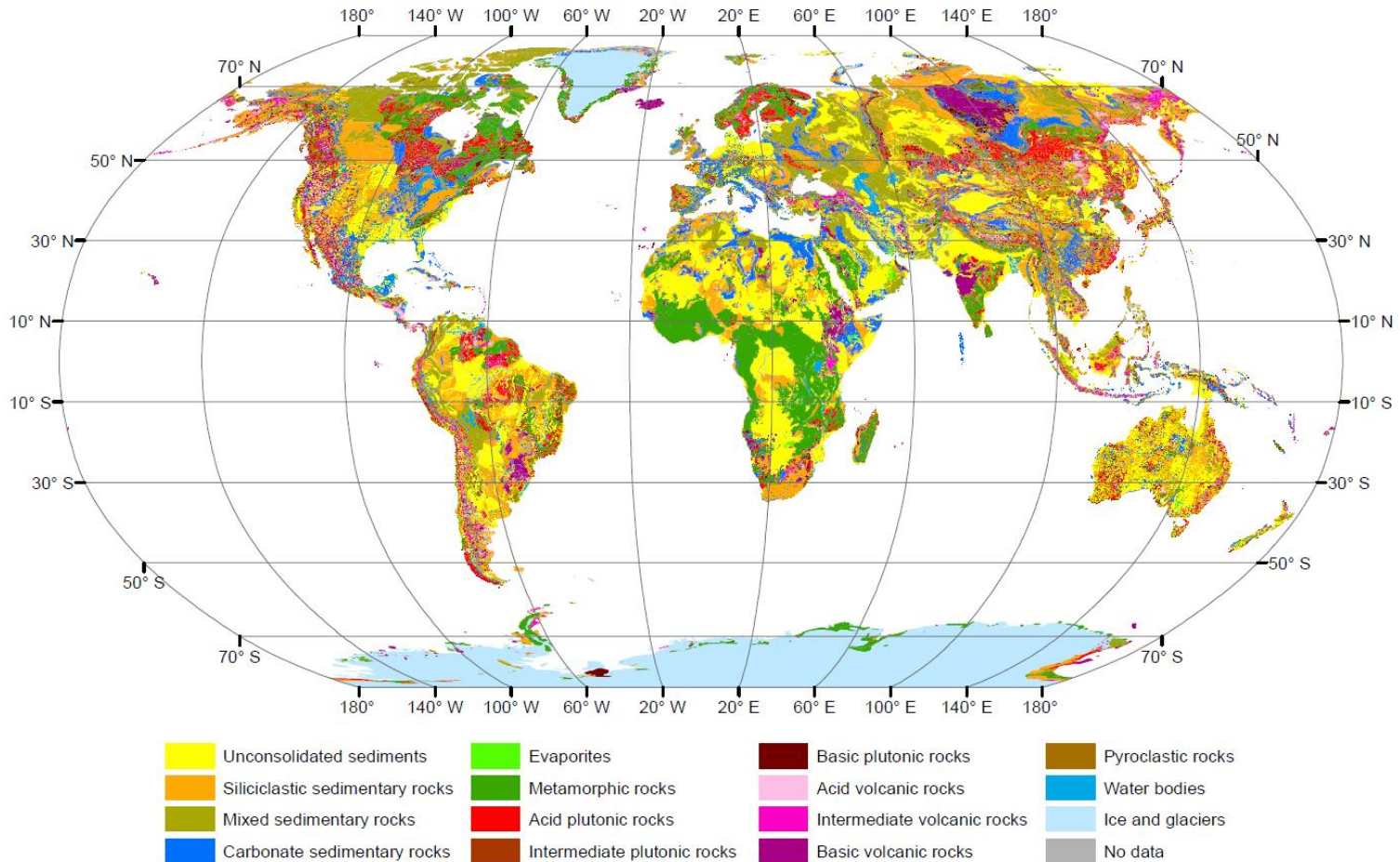
# Acid sensitivity

- Response from NFCs
  - Most suggest using geological maps
  - Some describe regions considered sensitive
- Suggestion: Updated sensitivity map from geological maps
  - Comparable across regions
    - Europe, North America, EECCA
  - Large scale – overview, not details
    - Available national maps for national chapters
  - Not perfect – the soil also plays a role



# Sensitivity from geological maps

## Lithological map of the world



After Hartmann J & Moosdorf N. 2012. The new global lithological map database GLiM: a representation of rock properties at the Earth surface. *Geochemistry, Geophysics, Geosystems* 13, 12. DOI: 10.1029/2012GC004370.



# Enquiry sent to NFCs

1. Which areas in your country are acid sensitive?
2. How do you decide if a water body is acidified?
3. National data availability?
  1. Representative surveys?
  2. Upscaling to whole area?
  3. Can you provide data/maps?
4. Is acidification status reported under the WFD?

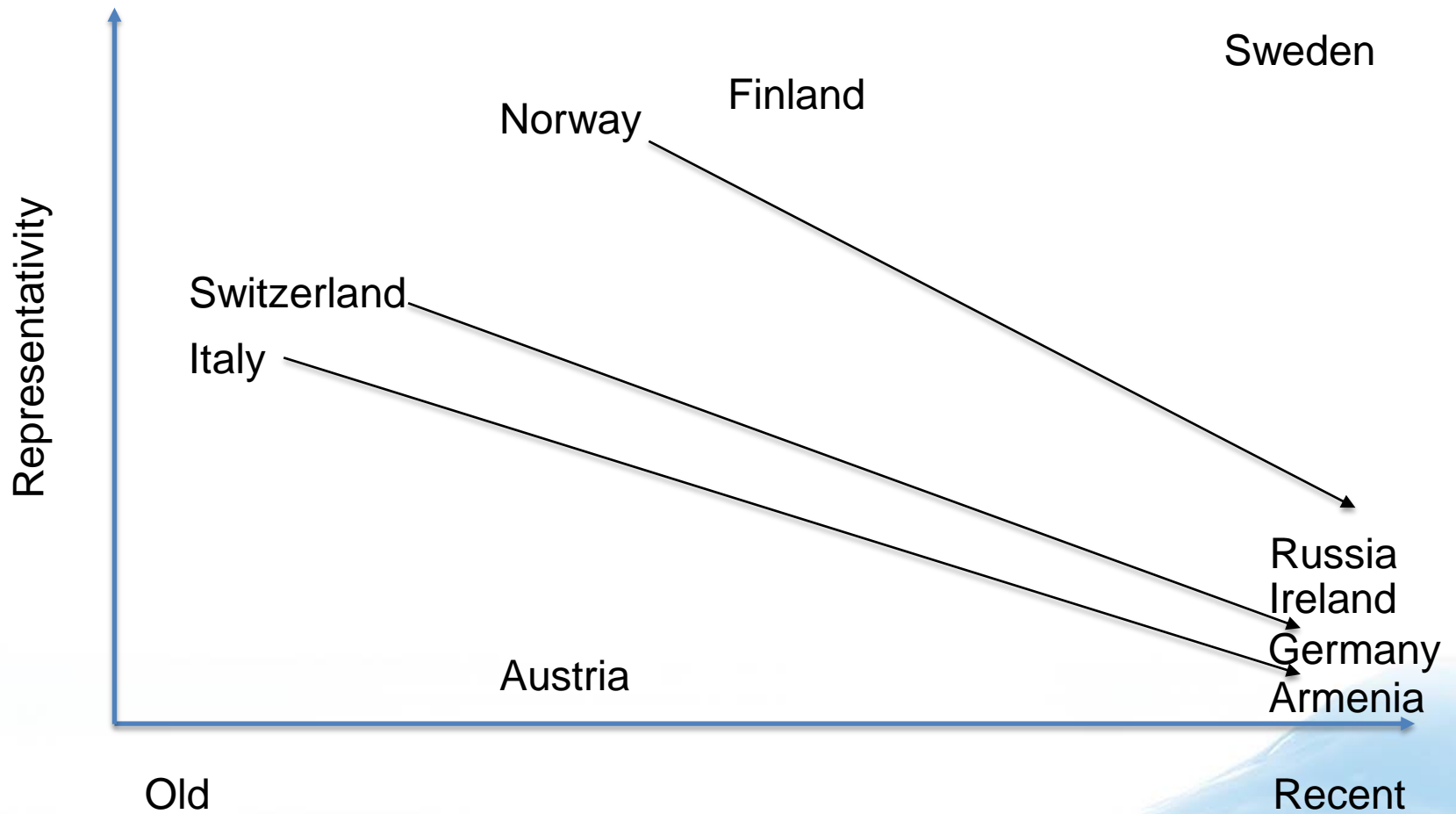
# Acidification criteria

- Response from NFCs
  - pH
  - ANC, ANC<sub>oaa</sub>
  - Alkalinity
  - Deviation from pre-industrial pH
  - Biological metrics
- Suggestion:
  - Use the term acidified/not acidified
    - Explain definition briefly in national chapters

# Enquiry sent to NFCs

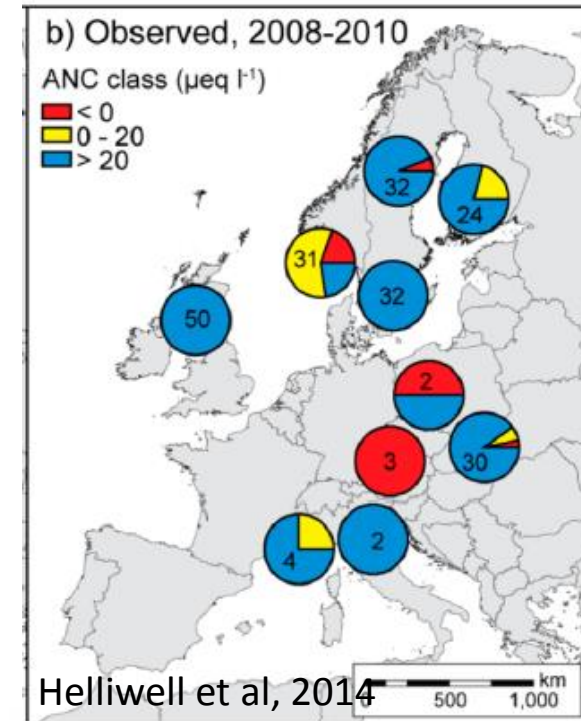
1. Which areas in your country are acid sensitive?
2. How do you decide if a water body is acidified?
- 3. National data availability?**
  1. Representative surveys?
  2. Upscaling to whole area?
  3. Can you provide data/maps?
4. Is acidification status reported under the WFD?

# National data availability



# Summarising data

- Ideally: Consistent quantitative overviews
  - e.g. number/proportion of acidified lakes/rivers/streams per country
  - Requires representative and relatively recent data
- Alternative: Rely more on national, partly qualitative assessments
  - Local knowledge of sensitivity and representativity of the monitored sites
  - Different approaches based on what is possible



# Enquiry sent to NFCs

1. Which areas in your country are acid sensitive?
2. How do you decide if a water body is acidified?
3. National data availability?
  1. Representative surveys?
  2. Upscaling to whole area?
  3. Can you provide data/maps?
4. **Is acidification status reported under the WFD?**



# WFD reporting

- 8 NFCs from countries reporting to the WFD – 4 say acidification status is reported
- WFD data has some potential
  - European overview
    - Comparable data – acidification status
    - May include countries that are less active in ICP Waters
  - Pressures/impacts/typology information may also be useful
  - Representativity major concern
    - Larger water bodies - potentially missing the most sensitive
    - Lack of reporting
  - NIVA involved in WFD analysis through ETC-ICM (EEA)

# Tentative outline

- Background (why do we need this report?)
  - Policy questions addressed
  - Difference between CL exceedance and acidified
- Acid sensitivity (which areas are we talking about?)
- Acidification status (what is the current situation?)
  - National chapters
  - Other data sources
  - Synthesis
- Policy implications (what are the consequences?)

# Time line

- This meeting: Discussions
- 1 June 2017: data/input call sent to NFCs
- 1 November: deadline for data/input call
- May 2018: discussion of draft report at the TF meeting

# Further approach

- Feedback from you: would you like to be involved?
  - So far, 11 NFCs but we'd like bigger geographical coverage
  - Canada, Czech Republic, Estonia, Poland, Spain, Serbia, UK, US..
- Feedback from EB&WGE?
- Co-operation with other ICPs?
- More detailed discussion on content&approach on Thursday