Yr Wyddfa/Snowdon Environmental Change Network

Producing and using climate-related information

Alex Turner       Clive Walmsley
Environmental Change Network:

- UK long-term surveillance network designed to determine how and why the natural environment is changing
- Network initiated in 1992 and currently there are 12 terrestrial and 45 freshwater sites run by a wide range of government, environmental and research bodies
- Cover a wide range of ecosystems
- In Wales - 1 terrestrial site (Snowdon), 3 freshwater sites (2 run by NRW – Nant Teyrn on Snowdon & River Wye)
- Snowdon terrestrial site running since 1995, freshwater since 2006
- 50% funded by Welsh Government
UK ECN sites - terrestrial (left) and freshwater (right)
ECN

Yr Wyddfa/Snowdon terrestrial ECN site

Characteristics

Altitudinal range 200-1085m
Area: 700ha
Annual rainfall 3500-5500mm
c. 1300 sheep
14 Annex 1 habitats under EU Habitats Directive
c. 500,000 visitors annually
**Environmental Change Network activity**

- Wide range of physical, chemical, biological and land-use measurements taken
- Data transferred to ECN Central Coordinating Unit run by CEH at University of Lancaster, funded by Defra
- Project overseen by annually convened advisory group with membership from WG, NRW, CEH Bangor & Lancaster, Universities (Bangor, Aberystwyth), SNPA
- Non-core site-specific protocols - snow duration, arctic-alpines, phenology, pollinators, fungi and cultural services
Providing ‘climate services’ for other organizations

- Ozone & NO\textsubscript{x} monitoring at Marchlyn Mawr for Welsh Air Quality Forum
- Precipitation (NO\textsubscript{3}, SO\textsubscript{4}^{2-}) and dry deposition (NO\textsubscript{x}, SO\textsubscript{2}, NH\textsubscript{4}) sampling for UK EAP
- Pollen sampling for UK Pollen Network (University of Hull)
- Pollinators
- Tick monitoring for Public Health England (now ceased)
Providing climate services for other organizations

• Sampling to detect effects of Eyjafjallajökull on vegetation for Defra
• Radionuclide sampling for AEA (now discontinued)
• Meteorological data for Fire Severity Index for Met Office
• Butterfly data for UK Butterfly Monitoring Scheme
• Monthly rainfall data for NRW flood modelling

• Supervise/input to student research work on Snowdon
  1 PhD, 4 MSc dissertations & 4 BSc dissertations
ECN

Ozone

Monthly mean ozone concentration at Marchlyn Mawr over the period 2000-2013
Mean pollen assemblages from Tauber traps at ECN sites. 
First row: lowland agricultural/grassland sites.
Second row: woodland sites.
Third row: upland sites

From Bunting 2013
Butterfly diversity

Mean number of butterflies per transect over the period 1996-2013
ECN
UK Phenology Network

Flowering advance/retreat for 57 species 2013 v 2014
ECN

Using ‘climate data’ from other sources for analysis and interpretation of Snowdon ECN data

- NAO and AO indices for interpretation of local met data patterns
- CET and regional precipitation data from Met Office
- National Butterfly trends from UK BMS
- National phenology trends from the UK Phenology Network
- Annual and monthly Ozone concentrations from a range of remote upland sites throughout the UK
Using external climate data: Air temperature v AO index

Monthly mean temperature residuals v monthly Arctic Oscillation Index
Snow duration and date of last melting vs MAM AO index

Last snow patch melt date vs March-May Arctic Oscillation Index 1991-2014
Local and National first flowering dates for Lesser Celandine and Bluebell 1999-2014
Summary

- The Yr Wyddfa/Snowdon ECN site run by NRW both ‘provides’ and ‘uses’ a wide range of ‘climate-related information’ which covers physical, chemical and biological variables to understand long-term environmental change.
- The data provided is mainly for ECN, WG and NRW, but the project does link into a diverse set of national schemes and is used extensively by the academic community.
- External data used for interpretation and analysis is drawn from a variety of national sources, predominantly meteorological and biological information.
Thank you