### Yr Wyddfa/Snowdon Environmental Change Network



# Producing and using climate-related information

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#### **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)





#### 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

Yr Wyddfa/Snowdon terrestrial ECN site



#### **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, arcticalpines, phenology, pollinators, fungi and cultural services



#### **Providing 'climate services' for other organizations**

- Ozone & NO<sub>x</sub> monitoring at Marchlyn Mawr for Welsh Air Quality Forum
- Precipitation (NO<sub>3</sub><sup>-</sup>,SO<sub>4</sub><sup>2-</sup>) and dry deposition (NO<sub>x</sub>, SO<sub>2</sub>, NH<sub>4</sub>) sampling for UKEAP
- 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





#### Ozone



Monthly mean ozone concentration at Marchlyn Mawr over the period 2000-2013

#### Pollen

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**







### ECN UK Phenology Network



Flowering advance/retreat for 57 species 2013 v 2014





## 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 v MAM AO index



Last snow patch melt date v March-May Arctic Oscillation Index 1991-2014



#### **Phenology - Local v National data**



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

