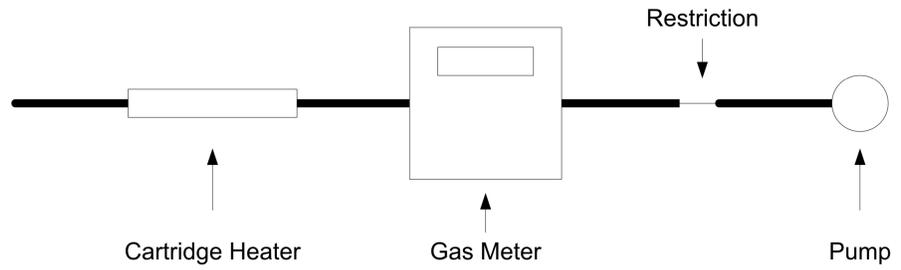




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Measurement Method

- TGM (Hg^0 , and RGM) sampled using automatic, integrated samplers.
- 10 Sampling sites across the UK
- Cartridge pairs changed 2-weekly
- Analysis by CVAFS using custom thermal desorber on Tekran 2537A



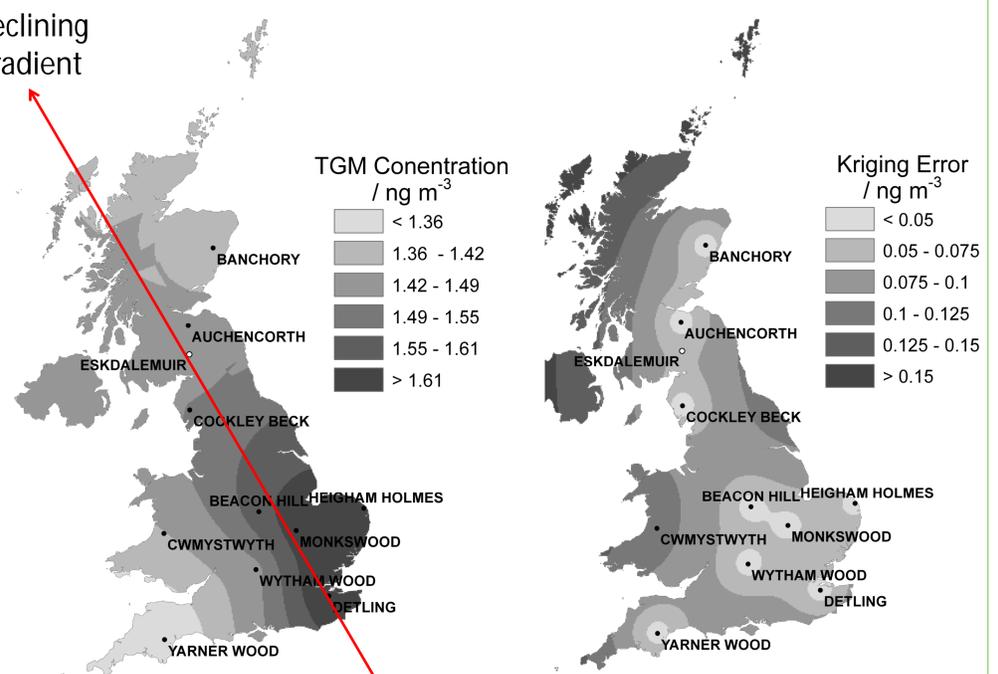
- Sampling at $\sim 20 \text{ ml min}^{-1}$
- It is important to keep the gas meter close to ambient pressure – so the in line restriction to control the flow rate needs to be between the gas meter and the pump.

Results

Site	Description	2005 Average	2006 Average	2007 Average	2008 Average	4-Year Average
Auchencorth	Open peatland	1.46	1.54	1.46	1.23	1.44
Banchory	Woodland	1.31	1.47	1.47	1.11	1.38
Beacon Hill	Farmland	1.37	1.50	1.91	1.61	1.59
Cockley Beck	Upper grassland	1.31	1.54	1.59	1.37	1.50
Cwmystwyth	Farmland	1.51	3.00	1.97	1.34	1.90
Detling	Farmland	1.48	1.81	1.90	1.20	1.69
Heigham Holmes	Farmland	1.07	1.94	1.98	-	1.63
Monks Wood	Woodland	1.53	1.73	1.60	1.41	1.64
Wytham Wood	Woodland	1.39	1.56	1.65	0.84	1.47
Yarner Wood	Woodland	1.18	1.51	1.42	1.03	1.31

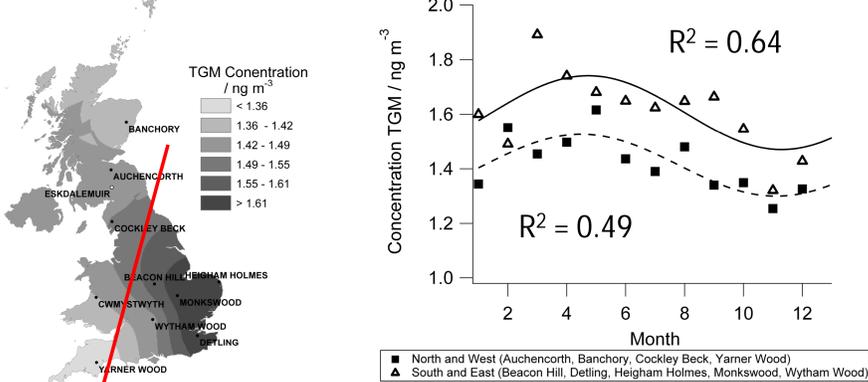
Interpolation of data

Declining Gradient



- 4 year average for each sampling site (excluding Cwmystwyth) was used in an Ordinary Kriging interpolation over the UK.
- Revealed a declining concentration gradient from SE to NW.
- Kriging Error map shows higher uncertainties in interpolated predictions in NW Scotland – probably due to low density of sampling sites.
- Using the National Physical Laboratory's rural monitoring site at Eskdalemuir as a comparison to check the Kriging prediction. Prediction: $1.46 \pm 0.07 \text{ ng m}^{-3}$ versus an actual recorded concentration of $1.54 \pm 0.06 \text{ ng m}^{-3}$. Not a perfect prediction, but within combined error.

Statistical analysis



- Checked statistical significance of gradient by dividing sites in to subsets: North and West, South and East. Using combined 4 year averages for each site, for each month.
- The difference between subsets was statistically significant, $p < 0.0003$

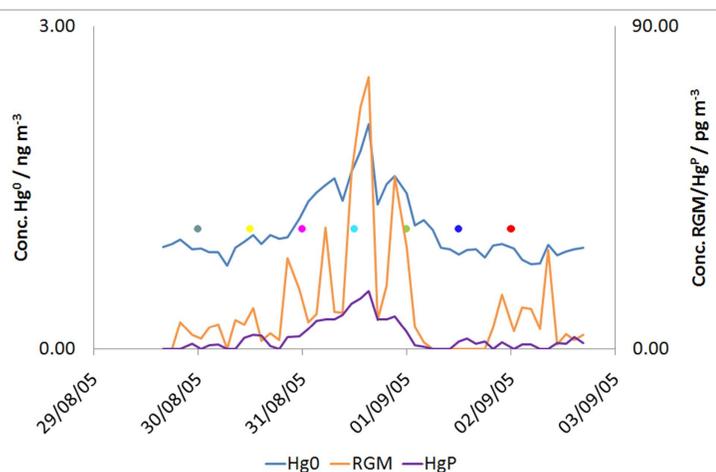
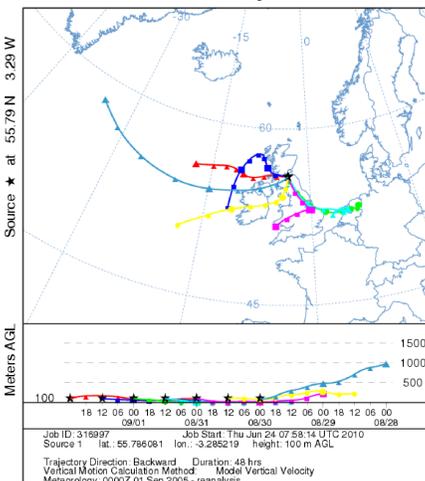
Sources

Continuous data from Auchencorth Moss were used to identify sources of mercury 'peaks', defined as concentrations > 4 standard deviations from the mean.

Air mass back trajectories were used to investigate sources of 'peaks'.

Coloured dots correspond to the different trajectories.

b. NOAA HYSPLIT MODEL
Backward trajectories ending at 0000 UTC 02 Sep 05
CDC1 Meteorological Data



- 8 of 12 'peaks' were associated with slower moving (shorter plotted trajectories) and originated from air masses from $90 - 225^\circ$ (E to SW) showing the potential influence of continental Europe on the UK.

- RGM is responsive to wind-speed: low speeds give higher levels, indicative of a local source.

Why does CEH monitor atmospheric mercury?

Because it enables the UK Government to meet its monitoring obligations