Introduction
Continuous monitoring of net ecosystem exchange (NEE) of methane (CH₄) by the eddy-covariance (EC) technique began in August 2010 at Auchencorth Moss (55° 47' N, 3° 12' E), a low-lying, drained acid peatland 20 km South-West of Edinburgh, Scotland, UK.

The site is an open moorland with extensive uniform fetch of blanket bog to the south, west and north. The vegetation present within the flux measurement footprint comprises mixed grass species, heather and substantial areas of moss species (Sphagnum spp. and Polytrichum spp.).

Methods
Eddy-covariance (EC) derives the flux \( F_g \) of trace gas \( g \) from the covariance between the deviation from their respective means of the vertical wind velocity component \( w \) and of the trace gas concentration \( \rho_g \):

\[
F_g = w \rho_g / \rho_g \text{ (1)}
\]

Measurements are taken atop a 2.5 m mast supporting a Gill Windmaster Pro ultrasonic anemometer operating at 20 Hz. Air is sampled ca. 15 cm below the anemometer’s sensor head using 0.95 cm (OD), ca. 20 m long Dekabon tubing and is analysed by a Los Gatos RMT-200 fast methane analyser operating at 10 Hz.

Results
- Linear correlation of CH₄ fluxes \( F_{CH₄} \) with friction velocity \( u_* \) and soil temperature \( T_{soil} \) (Fig. 1 a&b).
- Weak dependence on water table depth \( d_{WT} \) (Fig. 1 c).
- Uniform distribution of \( F_{CH₄} \) (u*) with respect to wind direction (Fig. 2).

- CH₄ NEE is well-characterised throughout the year by a multi-variate linear function of \( u_* \) (strongest dependence), \( T_{soil} \) and \( d_{WT} \) (Fig. 3).
- The site is a net source of CH₄ (emission of 23 kg CH₄ ha⁻¹ between August 2010 and July 2011).
- Net emissions were observed even during a period of complete snow cover.
- No quantitative correlation with fluxes obtained from chambers measurements.

Conclusions
CH₄ fluxes are largely turbulence-driven (deposition for \( u_* < 0.1 \text{ m s}^{-1} \)) suggesting storage within the undergrowth, which, along with spatial heterogeneity, could explain the discrepancies between chambers and EC measurements.

Due to storage, eddy-covariance might reflect the site’s net exchange of methane but not necessarily capture its low-level source/sink dynamics. Methane emissions have a global warming potential of 58 g CO₂-eq m⁻² y⁻¹, approximately half the measured net sequestration of CO₂ at the site.