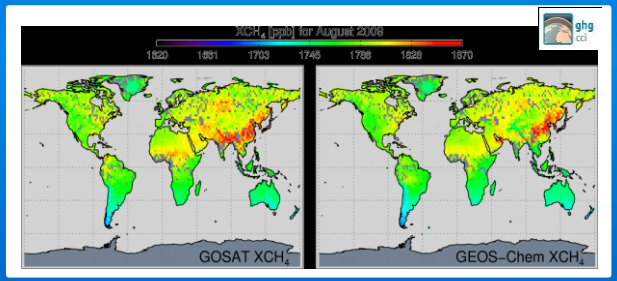
Research Interests

- Still large difficulties in bringing top down and bottom up regional carbon fluxes (and their climatic variations) into agreement
  - Difficulties in understanding of underlying processes
  - Limitations in observational capabilities
- Take advantage of new technologies and instruments (e.g. satellite, airborne sensors, sondes, aircore, small ground-based sensors)
  - to complement existing observational GHG networks
  - to provide new/different GHG observations on a range of scales
- Explore exciting opportunities for exploiting correlated tracers (e.g. CO, OCS, NOx, Fluorescence) and isotopes
- Need to focus on key regions with large uncertainties: Tropics and Sub-Tropics, Boreal regions (Sub-saharan Africa, SE Asia, Siberia …)
  - Establishment of longer-term observational capabilities more valuable than one-off campaigns

Our Research Focus: Development and exploiting of remote sensing and in-situ instrumentation for GHG observations

- **Ground-based (detailed, local)**
  - In-situ:
    - In-situ FTS trace gas analyser (CO_2, CH_4, CO, N_2O, ^{13}C … + fluxes)
    - Los Gatos analyzer (CO_2, CH_4)
  - Remote Sensing:
    - New TCCON FTS at RAL (GHG columns)
    - New portable FTS (CO_2, CH_4, CO columns)
- **Airborne remote sensing of GHG columns (regional scale)**
  - New high-performance spectrometer GHOST
  - New CO_2/CH_4 mini spectrometer
- **Satellite remote sensing of GHG columns and SIF (large scale, global)**
  - GOSAT (on-going), New OCO-2
  - Upcoming Sentinel5-P (2016), GOSAT-2 (2017), TanSat (2015 ?)

GHOST is currently installed on NASA Global Hawk



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National Centre for Earth Observation
NATURAL ENVIRONMENT RESEARCH COUNCIL

Research Focus

- Development and exploiting of remote sensing and in-situ instrumentation for GHG observations
  - to provide new GHG observations on a range of scales complementary to existing observational networks
  - To allow new ways for model testing and to help improve our understanding of carbon cycle processes for key regions
- (Some) Current research:
  - Development of accurate satellite GHG datasets (ESA Climate Change Initiative)
  - Evaluate GHG fluxes over Amazon with in-situ aircraft and satellite observations (NERC ACO Project)
  - Methane emissions from landfill sites using in-situ observations (GAUGE)
  - Fire emission ratios from satellite observations (Ross et al., GRL)
  - Develop new satellite missions (ESA CarbonSat, UKSA/CNES Microcarb)
  - Development of new airborne spectrometer for GHG remote sensing (NERC CAST)