



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

Gateway to the Earth

NERC RATE Programme, where are we now?

Dr Richard Shaw (British Geological Survey)

RATE Science Co-ordinator





TREE



Transfer - Exposure - Effects:

integrating the science needed to underpin radioactivity assessments for humans and wildlife

- Field activities
 - UK and International sampling e.g. soils, plants insects
- Experimental Progress
 - e.g. Soil incubation ^{129}I , ^{99}Tc , ^{77}Se ; plant and animal exposure (e.g. beta radiation) and analysis of tissue material
- Commission of ^{137}Cs source irradiation facility
- Manuscript submissions and Conference presentation
 - Journal on Environmental Radioactivity, Aqua Toxicolgy,
 - IAEA Modaria-Star workshop (Vienna)





- Deployment of wildlife camera traps in Chernobyl



- Media Interest, public engagement, e.g.
 - BBC's list of 100 things we didn't know last year
 - Channel 4 news; Swiss National Radio, Australian Radio (ABC)
 - Manchester Science Festival
- Project led summer school in Chernobyl, September 2015

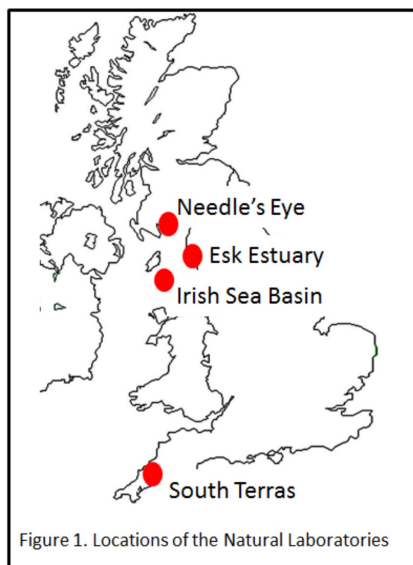


LO-RISE



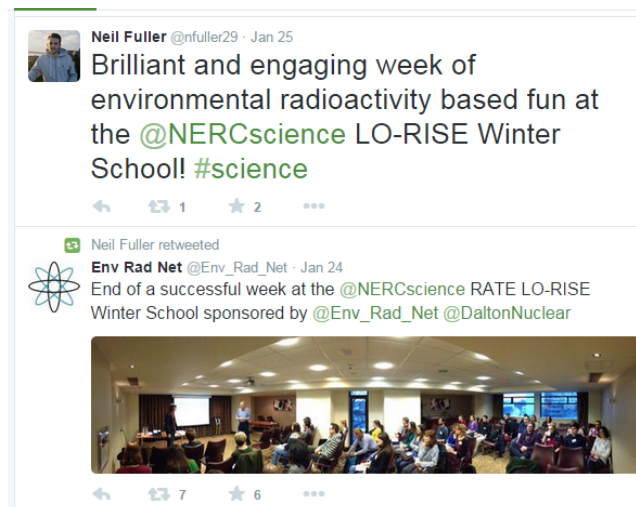
Residential winter school, Manchester January 2015

- 'Dose assessment tools environmental techniques'; 'Question Time' discussions on 'Energy resources' and 'Geological Disposal'; and, expert talks
- Attendance by all RATE PhDs and PDRAs + 20 additional UK PhDs/PDRAs representing 17 UK Institutes



Field work

- Expected to be largely complete by 2016
- To date:
 - Work in the Irish Sea is completed
 - Activities at the other sites are progressing well



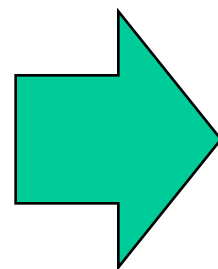


LO-RISE



Analytical Progress

- Sample characterisation
- Bulk XAS measurements and micro focus studies
- U-236 and C-14 measurements



- Population and Calibration of Manchester-Cranfield-Southampton geochemical / transport models

Recent Research Highlights

- Beam-time at the Diamond Light Source (B18, i18) and Soleil Synchrotron
- Daisy Ray
 - 4-month secondment at the Lawrence Livermore National Laboratory
 - Np analysis of Ravenglass and Irish Sea samples
- Manuscript submissions to European Journal of Soil Science, Applied Geochemistry and Journal on Environmental Radioactivity



HydroFRAME

- Modelling progress, e.g.
 - Increased computational efficiency and testing of numerical permeability calculations
 - 2D Modelling study for issues involved in detecting a deep fracture zone
 - Development of coupled flow and colloid migration equations to understand how colloids migrate within a fractured rock
 - Validated against small-scale laboratory experiments on artificial fractures



HydroFRAME

- Analytical Progress
 - DIAMOND X-Ray tomography of internal pore-structure of 'target fault zone' material from Grimsel
 - Sorption experiments for U on to Quartz at various ratios over time, pH and bicarbonate concentration
 - Presentation at Goldschmidt Geochemistry Conference, Prague 2015
- Recent Highlights
 - 1st prize at the 2015 Geological Society 'Early Career Hydrogeologists Conference': Ben Harvey (Birmingham)



Events

- **2015**

- September 2015
- October 2015
- November 2015

TREE Summer School, Chernobyl
GeoRepNet Annual Meeting, Edinburgh
Manchester Science Festival: TREE
Wildlife Camera Study Event

- **2016**

- *Easter 2016*
- Summer 2016

COGER meeting – details TBD
HydroFrame Summer School, Imperial
College (London) and Grimsel (Switzerland)

- **2017/18**

End of Programme Meeting, London