



A new UK Greenhouse Gas high-frequency tall tower network



Aoife Grant

ECU Vienna, ERE 5.2, 26th April 2012

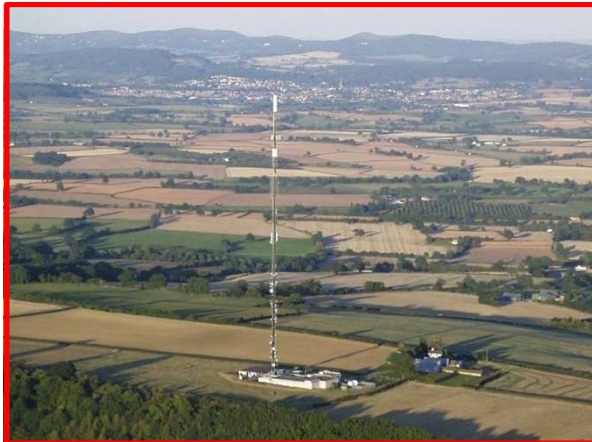


🔥 Location 3 new of sites

Mace Head



Ridge Hill



Angus



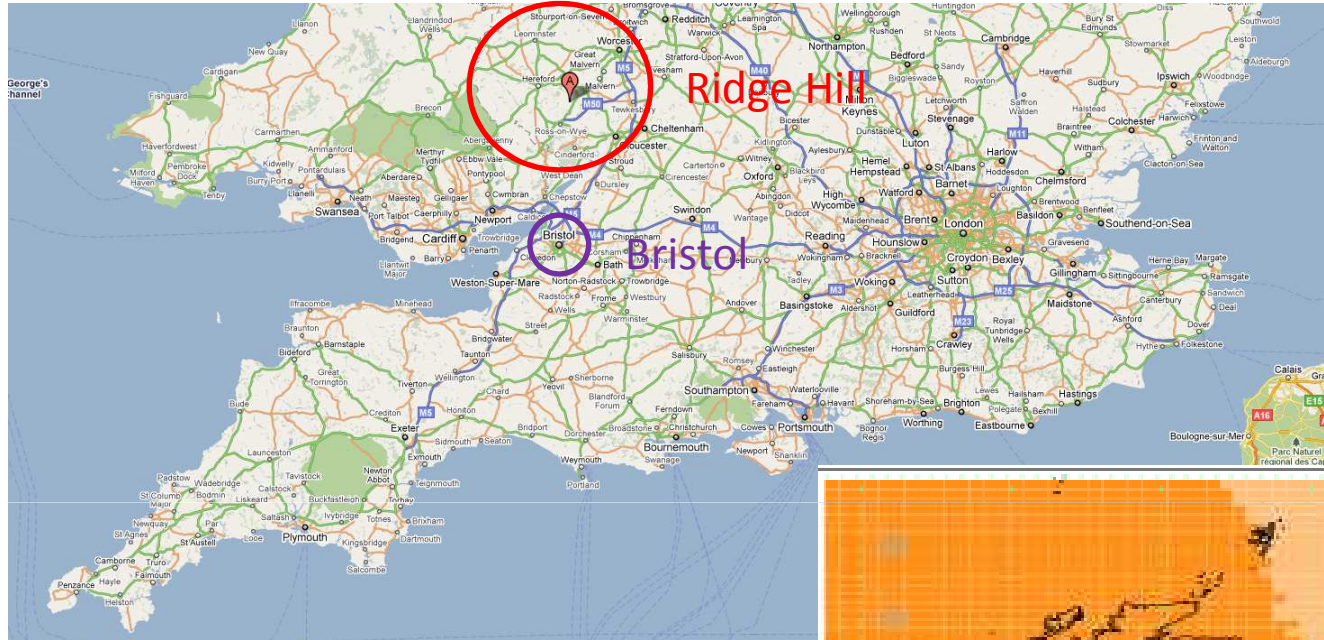
Tacolneston



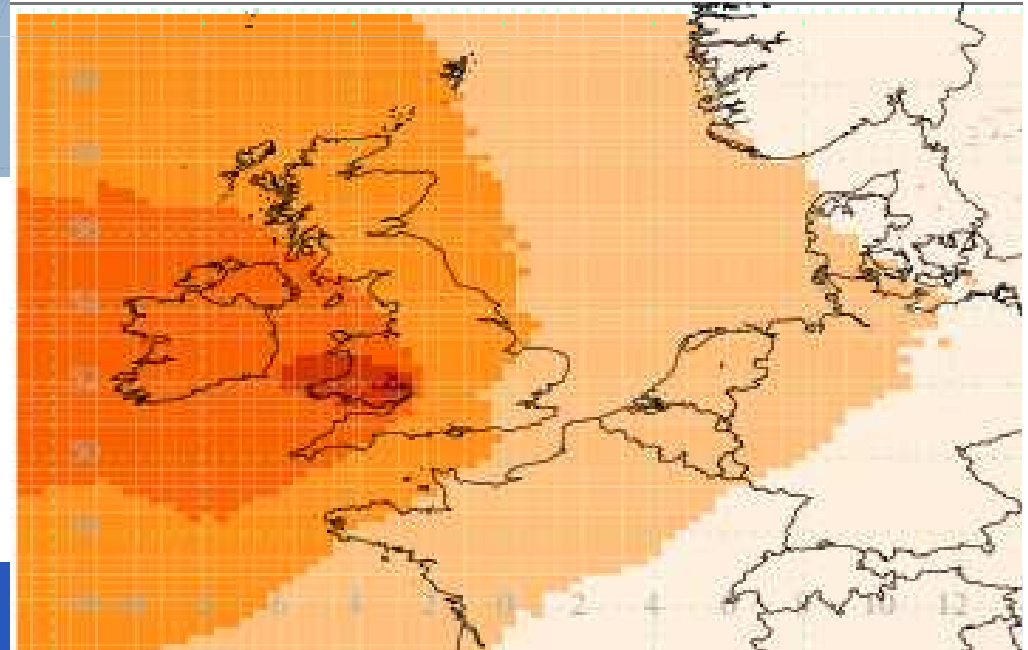
Key Objectives

- Establish new tall tower network to measure greenhouse gases across the UK
- Resolve English, Scottish, Welsh and N Irish emissions of GHG & halocarbons and use for inventory verification
- Assess trends in emissions and concentrations of GHGs & halocarbons; identify departure from expected trends & causes

Ridge Hill



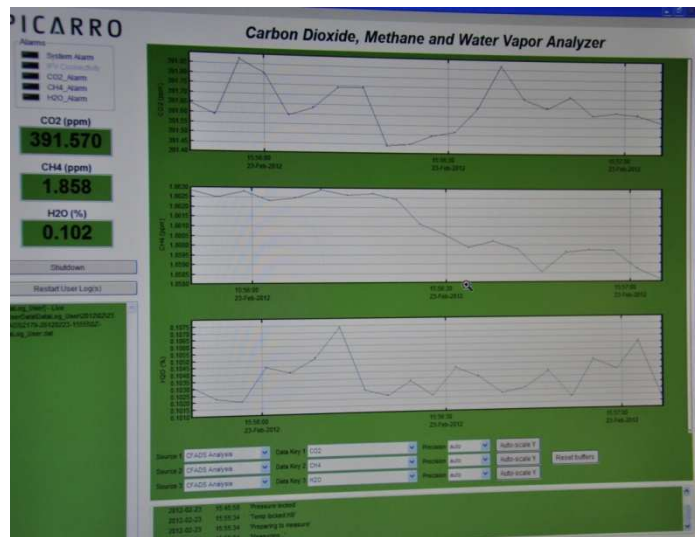
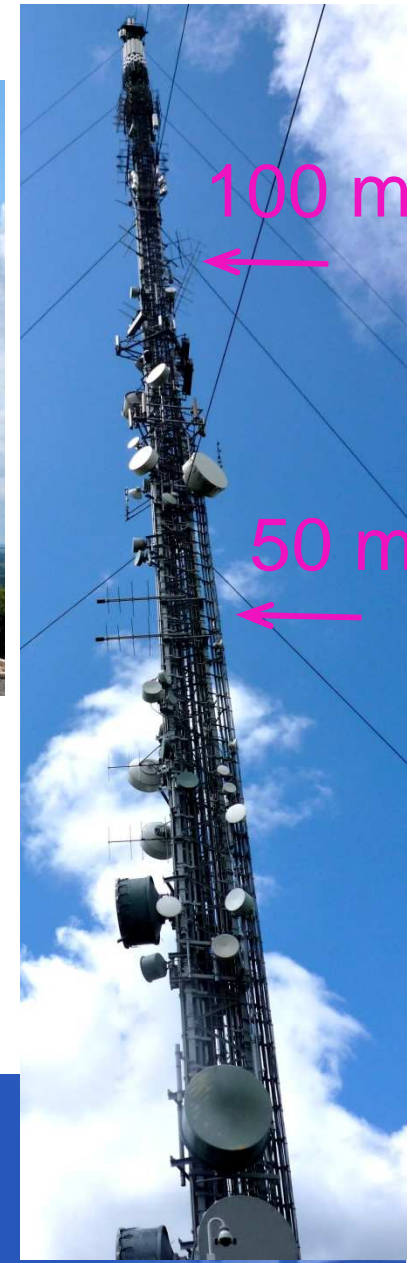
- Mast 164 m tall
- Real time measurements since 24th of February 2012



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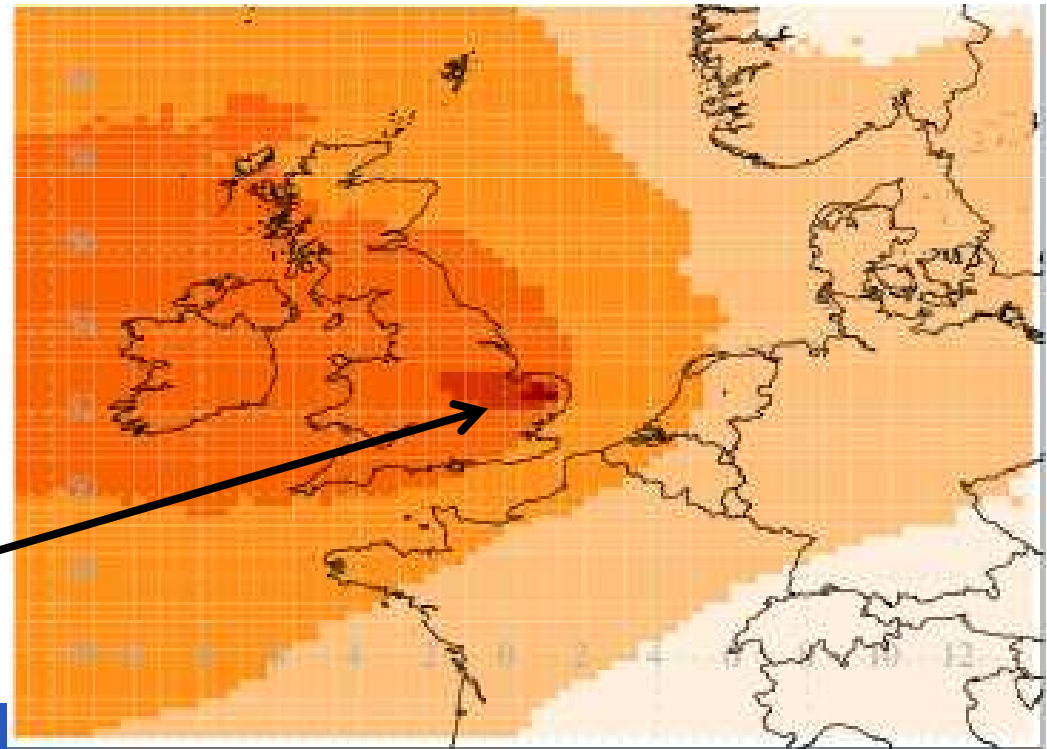
Ridge Hill



Tacolneston



Tacolneston



London



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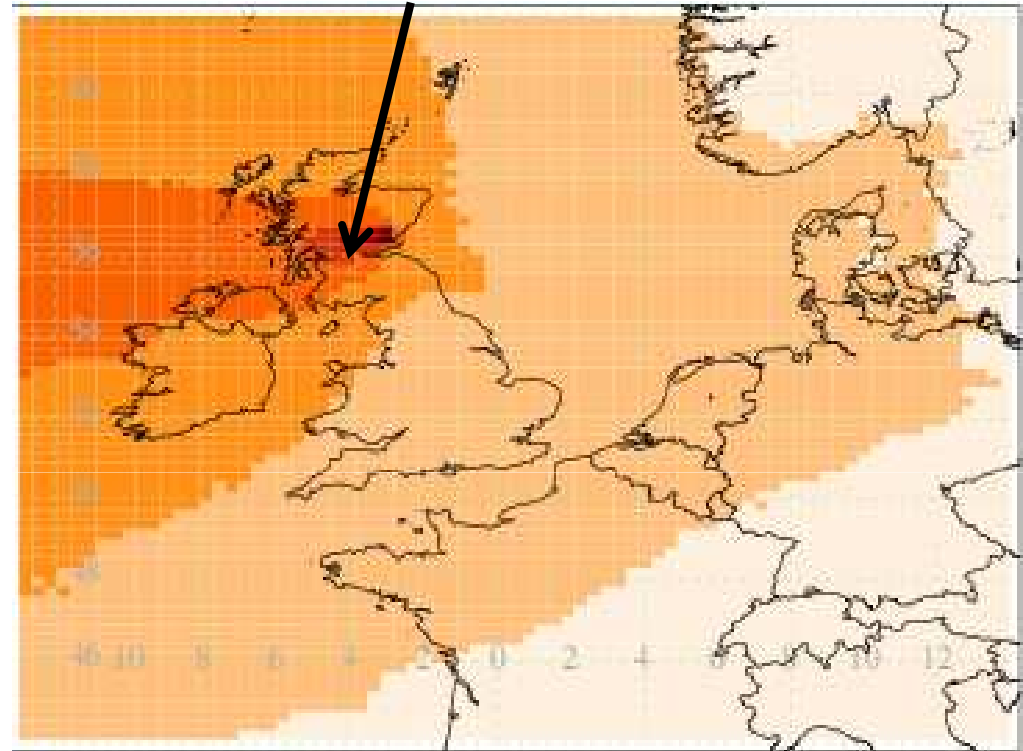
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Angus Tower



Glasgow & Edinburgh



- Mast: 230 m tall
- Line at: 185 m
- Led by Prof. John Moncrieff (University of Edinburgh)

Gases & Instrumentation

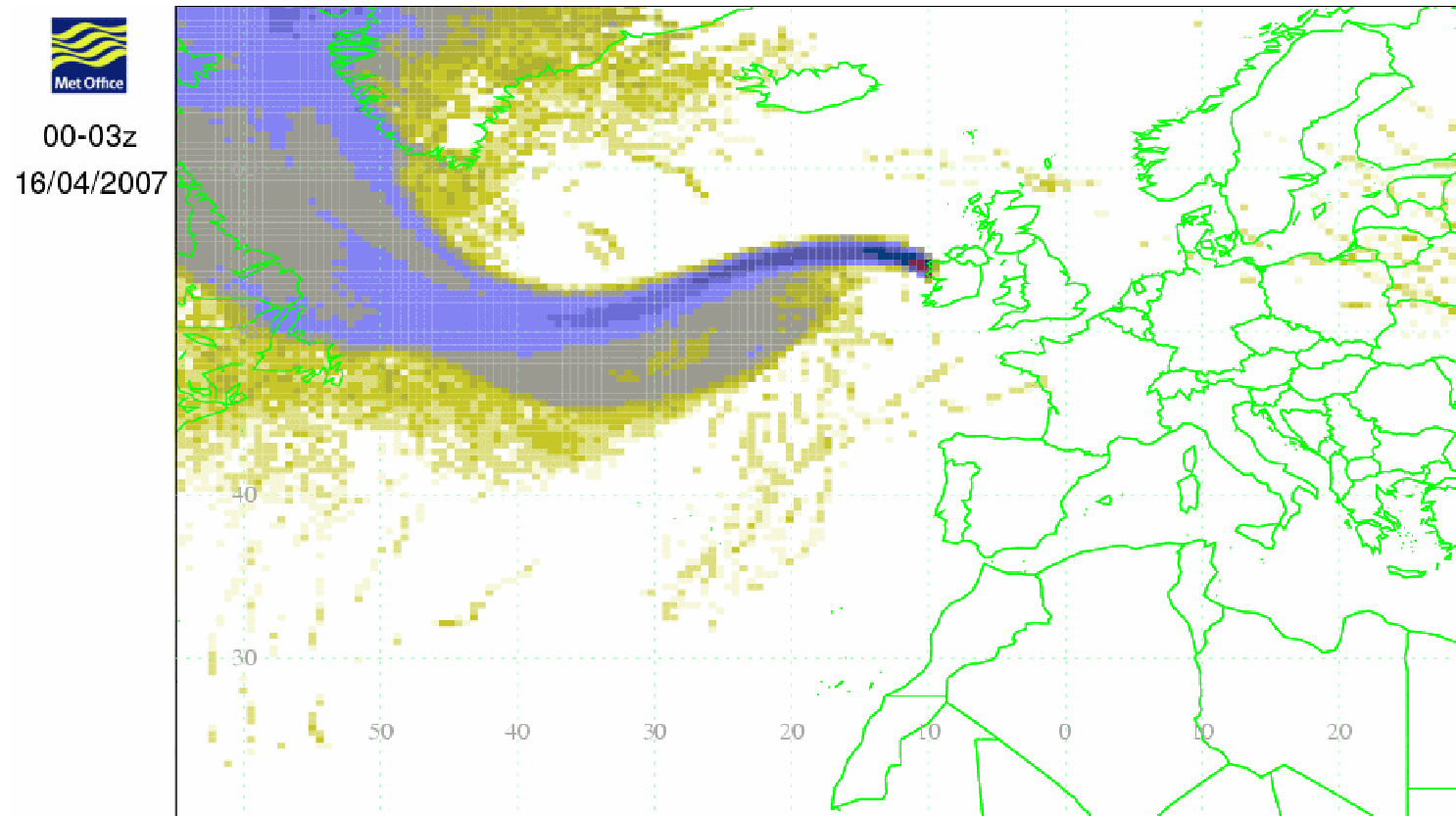
Angus	Tacolneston & Mace Head	Ridge Hill	Measurement Frequency	Instrument
CO ₂ CH ₄	CO ₂ CH ₄	CO ₂ CH ₄	1 second	Picarro – CRDS
N ₂ O SF ₆	N ₂ O SF ₆	N ₂ O SF ₆	10 min	GC-ECD
H ₂ CO	H ₂ CO		10 min	PP1/RGA3
	PFCs HFCs HCFCs CFCs Halon Etc.		1 hour	GC-Mass Spectrometer (Medusa)



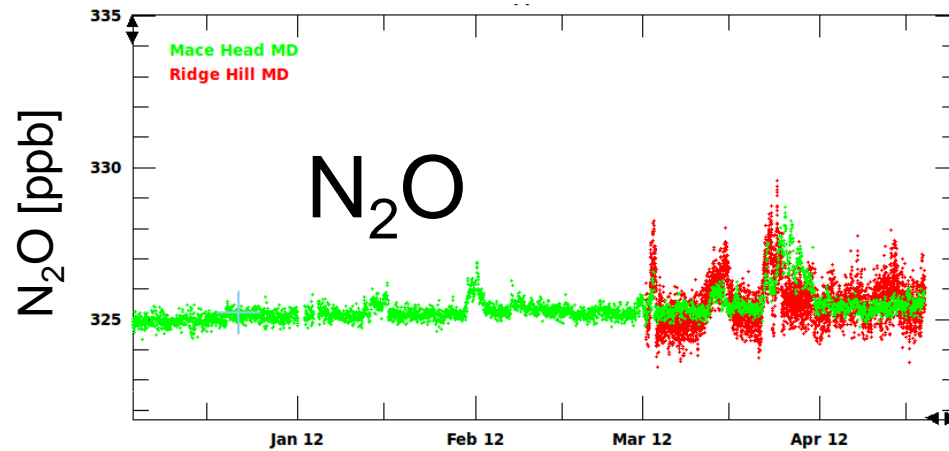
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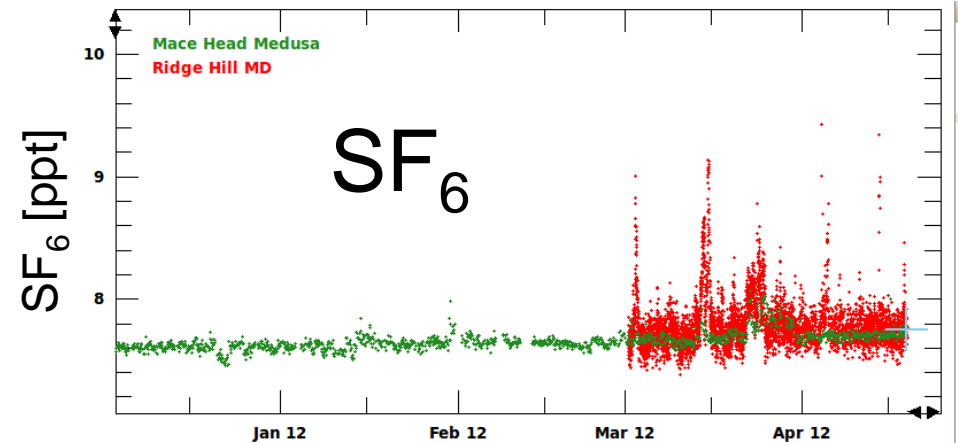
🌪️ Where does Mace Head air come from?



First Data at Ridge Hill



Mace Head
Ridge Hill

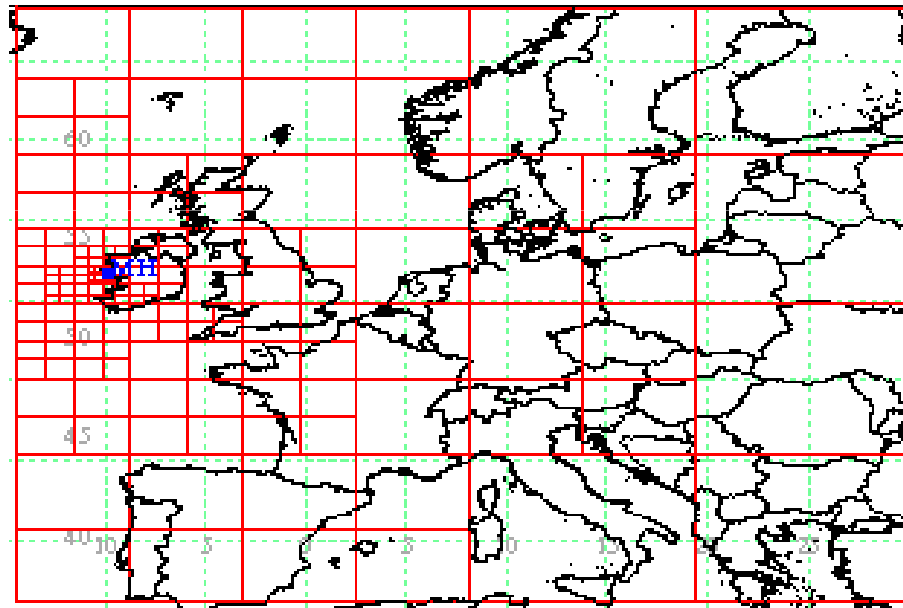


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Improved resolution

- Mace Head only – NAME model emission grid square size
- 2 year inversion

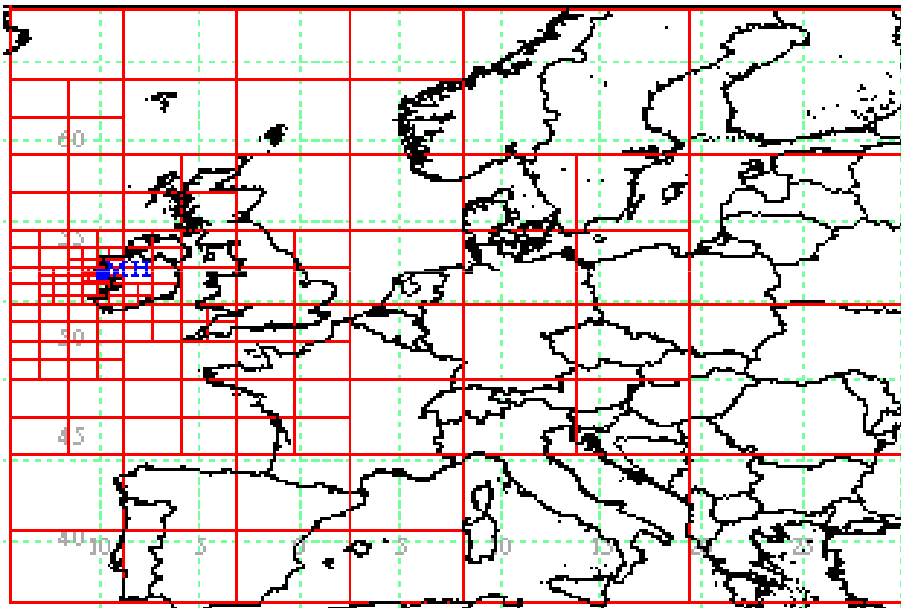


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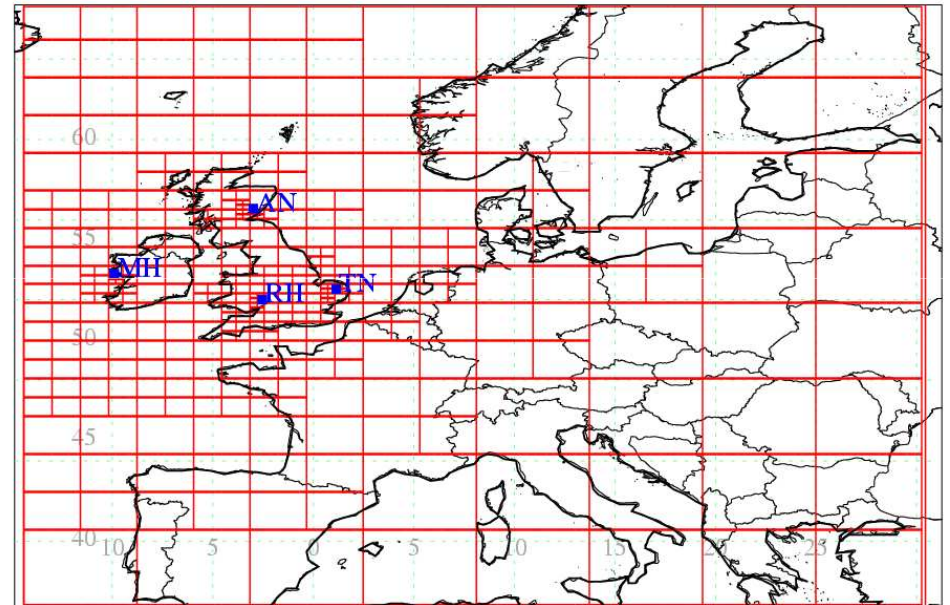


Improved resolution

- Mace Head + 3 new sites – Emission grid squares reduced in size >> enable distinction between DA emissions

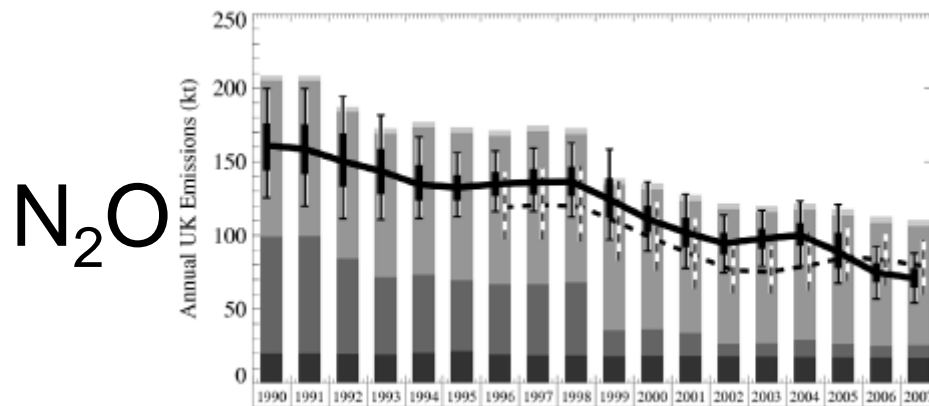


1 site



4 sites

UK Emission Estimates

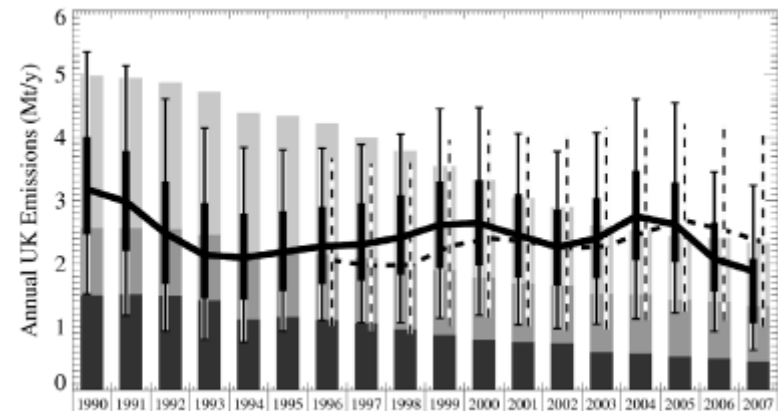


 NAME model emissions estimate

 UNFCCC emissions estimate

Source of these plots:
Manning et al., (2011) J.
Geophys. Res., 116, D02305

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Summary

- A tall tower network of greenhouse gas measurements across the UK has been established
- Measurements will enable constraint of regional level emissions of greenhouse gases across the UK using inversion methodology

Acknowledgments:

S O'Doherty; AJ Manning; TDS Young;
PG Simmonds; R Derwent; J Moncrieff;
WT Sturges; D Oram.



CO₂
CH₄
N₂O
HFC'S
SF₆



Any Questions?