

Café Scientifique Headingley

Monday 12th May 2025

Catching Radicals in our atmosphere

By: Dwayne Heard



The Leeds FAGE instrument for the measurement of radicals at 4730 m in Tibet

What is it that removes the emissions that we put into the atmosphere or that are put there naturally? Largely this is down to chemistry, and one particularly reactive molecule, the hydroxyl radical, OH, often referred as the detergent of the atmosphere. OH controls levels of greenhouse gases and generates secondary pollutants which are harmful to health. How long emissions survive in the atmosphere depend on how much OH there is, and we have measured the amount of OH in different parts of the world for almost 30 years. The levels of OH are miniscule, around 1 part in 100,000,000,000,000 of air, its lifetime is less than 1 second, and Dwayne uses a laser-induced fluorescence technique called FAGE to detect it.

It is important to know how future global temperatures and levels of air pollutants will respond to changes in our emissions. To predict this response, climate and air quality computer models need an accurate description of the chemistry which removes these emissions, and which can be very complex indeed. Given that OH is so central, one of the best ways to test how well we understand the chemistry, is to see how faithfully a model can reproduce the levels of OH we have measured in different clean and polluted environments worldwide. The agreement varies considerably, exposing weaknesses in our understanding of the chemistry which occurs both in the gas-phase and on the surface of aerosol particles.

Dwayne Heard was born in North Devon, the son of a dairy farmer, and has been Professor of Atmospheric Chemistry in the School of Chemistry at the University of Leeds since August 2004. He studies the chemistry and photochemistry of Earth's atmosphere and of the interstellar medium. His particular interest is in the chemistry of reactive, radical species using a combination of field measurements, laboratory experiments and numerical modelling both in the gas-phase and at aerosol surfaces. Dwayne is author of around 250 peer-reviewed papers, he received the Environment Prize from the Royal Society of Chemistry in 2017 and was President of the Royal Society of Chemistry Faraday Division from 2021-2024.

Venue: The New Headingley Club, 56 St Michaels Road, LS6 3BG

Time: Room opens 7:30pm, Talk begins promptly at 7:45pm

Entry: Donation please for room hire and expenses: £4 at the door



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