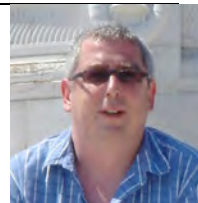


School of Physics – Staff Profile

Dr Colin O'Dowd - Senior Lecturer

1987 B.Sc Physics NUI, Galway
1992 Ph.D. Physics, UMIST
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Research Cluster and Interests: **Atmospheric, Aerosol and Environment Cluster
Centre for Climate & Air Pollution Studies (Director)**

The general area of research centres on the impact of atmospheric composition on climate change. Greenhouse gases are driving global warming processes while atmospheric aerosol particles produce haze and cloud layers that partly reduce the rate of global warming. Atmospheric aerosols are tiny airborne particles or droplets, ranging in size from nanometers to microns and have variable chemical composition. They are essential for providing condensation sites for cloud drops to form on.

Thematic areas include aerosol formation and transformation studies, aerosol chemistry, aerosol-cloud-precipitation interactions, biogeochemical cycling, aerosol impacts on climate and aerosol impacts on air quality. The right image illustrates the effect of aerosols on cloud reflectance – seen in the image are ship tracks produced in cloud by ship aerosol emissions. The emitted particles act as cloud condensation nuclei, producing more cloud droplets and resulting in higher-reflecting clouds. Brighter clouds help to reduce the rate of global warming resulting from greenhouse gases. Much of the work is conducted at the School's Mace Head Atmospheric Research Station, located on the Atlantic coast line (See lower left image).



The location is ideal for sampling both clean marine air and polluted continental air. The station contains some of the most sophisticated atmospheric sampling equipment in the world ranging from aerosol mass spectrometers to cloud radars and other *in-situ* and *remote-sensing* instruments. In addition to aerosol, cloud and meteorological measurements, various programmes researching greenhouse gases levels, CFC's levels and air-sea exchange of CO₂ and ozone are also active.

Selected Recent Publications:

Rosenfeld, D., U. Lohmann, G.B. Raga, C.D. O'Dowd, M. Kulmala, S. Fuzzi, A. Reissell, M. O. Andreae., Flood or drought: How do aerosols affect precipitation?, *Science*, Vol 231, DOI: 10.1126/science.1160606, 2008.

Mulcahy, J. P., C. D. O'Dowd, S. G. Jennings and D. Ceburnis, Significant Enhancement of Aerosol Optical Depth in Marine Air under High Wind Conditions, *Geophys. Res. Letts.*, Vol. 35, L16810, doi:10.1029/2008GL034303, 2008

Semmler, S. Varghese, R. McGrath, P. Nolan, S. Wang, P. Lynch, C. O'Dowd, Influence of an increased sea surface temperature on North Atlantic cyclones, *J. Geophys. Res.*, D02107, doi/2006JD008213, 2008

O'Dowd, C.D., Y. J. Yoon, W. Junkerman, P. P. Aalto, and H. Lihavainen, Airborne Measurements of Nucleation Mode Particles II: Boreal Forest Nucleation Events *Atmos. Chem. Phys.*, in press, 2008.