

# Background Reading for Teachers

## Climate Information

These articles have been written by the authors of the project **Citizen Science: Air Quality**, Professor Dudley Shallcross and Tim Harrison.

### Science in School

This is a free on-line journal aimed at school teachers. Some articles are also available in several European languages.

Harrison T.G. and Shallcross D.E. (2010). [A Hole In The Sky](#), Science in School, 17, 46-53.

Harrison T.G. and Shallcross D.E. (2011). [Is climate change all gloom and doom? Introducing stabilisation wedges](#), Science in School, 20, 60-65.

Harrison T.G., Kahn A. Shallcross D.E. (2017). [Climate change: why the oceans matter](#), Science in School (March), 39, 12-15.

Shallcross, D.E., Harrison, T.G., (2008). [Climate Change modelling in the classroom](#), Science in School, 9, 28-33.

Shallcross, D.E., Harison, T.G., (2011). [Smoke is in the air: how fireworks affect air quality](#), Science in School, 21, 48-51.

### Science For All

These articles are in English (and Portuguese and Spanish) on this science blog site hosted at INCT in Brazil.

Harrison T.G. and Duncan Wass D (2013). [Butan-1-ol: An Advanced Biofuel?](#), Science for All, , INCT Catalise, Brazil

Say, Daniel and Harrison, Tim, [Tracking a country's consumption of ozone-depleting substances](#), Science For All Blogsite, INCT Catalise, Brazil (2018).

Harrison Tim and Shallcross Dudley, ((2019). [The Granny Model' of the Climate or How Can a Grandmother Help Explain Climate Change?](#), Science For All, INCT Catalise, Brazil

## School Science Review (SSR)

This magazine is available to members of the ASE. Secondary schools may have back copies. Members can access copies via the internet.

Issue 343, published December 2011, was guest edited by Tim Harrison:

Badger M.P.S., Pancost R.D. and Harrison T.G. (2011). Determining how atmospheric carbon dioxide concentrations have changed during the history of the Earth, *School Science Review*, 93(343), 49-57.

Carl Percival and Rhodelle Burke 'The atmospheric detergent and the elusive Criegee biradical, *School Science Review*, 93(343), 49-57. p67.

Azmi Mohamed and Julian Eastoe, How can we use carbon dioxide as a solvent? *School Science Review*, 93(343), p73.

Kevin C. Clemitshaw, Measurement of air pollutants in the troposphere, *School Science Review*, 93(343), p59.

Dudley E.Shallcross and Damien Martin,. Perfluorocarbons (PFCs), some of the immortal molecules in the Earth's atmosphere, *School Science Review*, 93(343), p87.

## Chemistry Review

This is a commercial magazine ([Hodder Education](#)) aimed at post 16 students. and their teachers. Most secondary school libraries should have back copies. Chemistry Review also has an archive that contains many of these articles. Individual copies can also be downloaded (cost).

Harrison T.G. (2006). Chemistry that gets right up your nose, *Chemistry Review*, 16(2), 2-6.

Harrison, T.G., Shallcross, D.E., Henshaw, S., Detecting CO<sub>2</sub> -the Hunt for Greenhouse-gas Emissions (2006). *Chemistry Review*, 15 (3), 27-31.

Harrison, T.G., Shallcross, D.E., Henshaw, S., Detecting CO<sub>2</sub> -the Hunt for Greenhouse-gas Emissions (2006). *Chemistry Review*, 15 (3), 27-31.

Tim Harrison, Dudley Shallcross, Anwar Khan and Alison Trew. 'Air quality and data mining,' *Chemistry Review*, 31(1), pp2-4, September 2021.

Tim Harrison, Dudley Shallcross, Anwar Khan and Alison Trew. 'How did lockdown affect air quality?', *Chemistry Review*, 31(1), pp26-28, September 2021.

Shallcross, D.E. and Harrison, T.G., (2009). Out of thin air. Hydrogen in the Earth's Atmosphere, Chemistry Review, 19 (2), 2-6.

Shallcross, D.E. and Harrison, T.G., (2010b). Out of thin air. From Volcanoes to Sea Salt: Atmospheric Sulfur, Chemistry Review, 20 (1), 16-19.

Shallcross, D.E. and Harrison, T.G., (2010). Out of thin air. Atmospheric Nitrogen. Chemistry Review, 20 (2), 7-9.

Grant A., and Harrison T.G. (2011). Out of Thin Air. Poison in the Air: Atmospheric Carbon monoxide, Chemistry Review, 20(3).

Khan A., Harrison, T.G. and Shallcross, D.E. (2011). Out of Thin Air. Do Ants Destroy the Ozone Layer? Chemistry Review, 20(4).

Ashfold M., Orr-Ewing A.J., Harrison T.G., Murdock D. Roberts G. and Grubbs M (2016). 'Lasers, sunscreens and free radicals', Chemistry Review 25(2) 2-7.

Tim Harrison and Dudley Shallcross, Volatile organic compounds: where do smells go? (2016). Chemistry Review, 26(1), 18-21.

Inglis G., Pancost R. & Harrison T.G. (2016) Reconstructing Past Climates Using Molecular Fossils. Chemistry Review, 26(3), 2-6.

### Other Articles

Dudley Shallcross and Tim Harrison (2013). [Radical changes in our atmosphere](#), Education in Chemistry, RSC, September 22-25.

Shallcross, D.E., Harrison, T.G., (2007). Climate change made simple. Physics Education 42 592-597.

Priestley, M., M. Le Breton, T. J. Bannan, K. E. Leather, A. Bacak, E. Reyes Villegas, F. De Vocht, Beth M. A. Shallcross, T. Brazier, M. A. Khan, J. Allan, D. E. Shallcross, H. Coe, C. J. Percival. (2018) [Emissions of isocyanates, amides and nitrates from an anthropogenic biomass burning event using a TOF-CIMS](#). J. Geophys. Res., 123, 7687-7704.

## Post 16 Outreach Project

The School of Chemistry at The University of Bristol has an on-going [Outreach Project](#) to use academics, postdoctoral research assistants and postgraduate students from the school of Chemistry, to produce a freely available set of chemistry comprehension exercises targeted at Post 16 chemists, many of which are linked to climate change or atmospheric chemistry.

The articles range from atmospheric spectroscopy [a], through Criegee intermediates [b,c], ozone depletion [d,e], aircraft [f], past climates [g] and the roles of specific molecules in climate change [h,i].

You can access these articles by clicking on the title.

- a. Barbara Marchetti, [Spectroscopy and Photochemistry of Atmospherically Relevant Oxidants: Criegee Intermediates](#), (last accessed 17 March 2020).
- b. Anwar Khan, [Criegee Biradicals](#), (last accessed 17 March 2020).
- c. Rabi Chhantyal Pun, [Removal of Trifluoroacetic Acid from the Atmosphere by Criegee Intermediates](#), (last accessed 17 March 2020).
- d. Dudley Shallcross and Anwar Khan, [Leaf Cutter Ants, Farmed Fungus and Ozone Depletion](#), (last accessed 17 March 2020).
- e. Daniel Say, [Tracking India's consumption of ozone-depleting substances](#), (last accessed 17 March 2020).
- f. Amy Foulds, [How are aircraft affecting our atmosphere?](#), (last accessed 17 March 2020).
- g. Gordon Inglis, [Reconstructing Past Climates Using Molecular Fossils](#), (last accessed 17 March 2020).
- h. Dudley Shallcross, [Dimethylsulfide \(DMS\) in the Troposphere](#) (last accessed 17 March 2020).
- i. Eleni Michalopoulou, [Climate Change and Industrial Sources of Fluorinated Hydrocarbons](#), (last accessed 17 March 2020).