

References

- Acker J.G. and Leptoukh, G. (2007) Online analysis enhances use of NASA earth science data, *Eos, Transactions. American Geophysical Union*, Vol. 88, 2, pp. 14 and 17.
- Black, K., Davis, P., Lynch, P., Jones, M., McGettigan, M. and Osborne, B. (2006) Long-term trends in solar irradiance in Ireland and their potential effects on gross primary productivity, *Agricultural and Forest Meteorology*, Vol. 141, pp. 118–32.
- Black, K., O'Brien, P., Redmond, J., Barrett, F. and Twomey, M. (2009) The extent of peatland afforestation in Ireland, *Irish Forestry*, Vol. 65, pp. 61–71.
- Cannaby, H. and Hüsrevoğlu, Y.S. (2009) Low frequency variability and long-term trends in Irish SST records, *ICES Journal of Marine Science*, Vol. 66, 7 pp. 1480–9.
- Cannaby, H. and Nolan, G. (2009) Physical oceanography, in *Irish Ocean Climate and Ecosystem Status Report 2009*. Nolan, G., Gillooly, M. and Whelan, K. (eds.) Marine Institute, 100 pp.
- Carroll, E., Sparks, T., Donnelly, A. and Cooney, T. (2009) Irish phenological observations from the early 20th century reveal a strong response to temperature. *Biology and Environment: Proceedings of the Royal Irish Academy*. Vol. 109B, 2 pp. 115–26.
- Coll, J., Maguire, C., Sweeney, J. (2009) *Biodiversity and Climate Change in Ireland – Briefing Paper*: http://www.comharsdc.ie/files/Biodiversity_ClimateBriefing%20Paper_Final_6thJan_2009.doc.pdf
- Cusack, C. (2009) Phytoplankton, in *Irish Ocean Climate and Ecosystem Status Report 2009*. Nolan, G., Gillooly, M. and Whelan, K. (eds.) Marine Institute, Galway, Ireland, pp. 100.
- Daly, K. and Fealy, R. (2007) *Digital Soil Information System for Ireland – Scoping Study*. Environmental Protection Agency (EPA), Johnstown Castle Estate, Co. Wexford, Ireland: <http://www.epa.ie/downloads/pubs/research/land/name.23747.en.html>
- Davies, D., Kumar, S. and Descloitres, J. (2004) Global fire monitoring using MODIS near-real-time satellite data, *GIM International*, Vol. 18 (4), pp. 41–3.
- De Mol, B., Kozachenko, M., Wheeler, A., Hugo, A., Henriët, J.-P and Olu-Le-Roy, K. (2007) Thérèse Mound: a case study of coral bank development in the Belgica Mound Province, Porcupine Seabight, *International Journal of Earth Sciences*, Vol. 96, No. 1, pp. 103–20.
- Derwent, R.G., Ryall, D.B., Manning, A.J., Simmonds, P.G., O'Doherty, S., Biraud, S., Ciais, P., Ramonet, M. and Jennings, S.G. (2002) Continuous observations of carbon dioxide at Mace Head, Ireland from 1995 to 1999 and its net European ecosystem exchange, *Atmospheric Environment*, Vol. 36, pp. 2799–807.
- Derwent, R.G., Simmonds, P.G. Manning, A.J. and Spain, T.G. (2007) Trends over a 20-year period from 1987 to 2007 in surface ozone at the atmospheric research station, Mace Head, Ireland, *Atmospheric Environment*, Vol. 41, pp. 9091–8.
- Dlugokencky, E.J., Bruhwiler L. White, J.W.C., Emmons, L.K., Novelli, P.C., Montzka, S.A., Masarie, K.A., Lang, P.M., Crotwell, A.M., Miller, J.B. and Gatti, L.V. (2009) Observational constraints on recent increases in the atmospheric CH₄ burden, *Geophysical Research Letters*, Vol. 36, L18803.
- Duffy, P., Hanley, E., Hyde, B., O'Brien, P., Ponzi, J., Cotter, E. and Black, K. (2012) *National Inventory Report, 2012. Greenhouse Gas Emissions 1990–2010*, Reported to the UNFCCC, EPA, Johnstown Castle Estate, Co. Wexford, Ireland.
- Dunne, S., Hanafin, J., Lynch, P., McGrath, R., Nishimura, E., Nolan, P., Ratnam, J.V., Semmler, T., Sweeney, C. and Wang, S. (2008) *Ireland in a Warmer World, Scientific Predictions of the Irish Climate in the Twenty-First Century*. (R. McGrath and P. Lynch, eds.), Community Climate Change Consortium for Ireland: www.c4i.ie/docs/IrelandinaWarmerWorld.pdf
- Dwyer, N. (2008) *Climate Change – Implementation of the Global Climate Observing System in Ireland*. Environmental Research Centre Report 8, EPA, Johnstown Castle Estate, Co. Wexford, Ireland: <http://www.epa.ie/downloads/pubs/research/climate/name.24240.en.html>
- Dwyer, N. (2010) *Current Status and Required Actions for National Climate Observing Systems*. Environmental Research Centre Report 14, EPA, Johnstown Castle Estate, Co. Wexford, Ireland: <http://www.epa.ie/downloads/pubs/research/climate/name.27740.en.html>
- Eaton, J.M., McGoff, N.M., Byrne, K.A., Leahy, P. and Kiely, G. (2008) Land cover change and soil organic carbon stocks in the Republic of Ireland, 1851–2000, *Climatic Change*, Vol. 91, Nos 3–4, pp. 317–34.
- EPA (Environmental Protection Agency) (2011) *Review of the EPA Hydrometric Programme*. EPA, Johnstown Castle Estate, Co. Wexford, Ireland.

- Fennell, S. (2007) A study of the behaviour and interannual variability of surface salinity and temperature at the M3 weather buoy off the southwest coast of Ireland. MSc, Marine Institute, Co. Galway, Ireland.
- Giglio, L., Descloitres, J., Justice, C. O. and Kaufman, Y.J. (2003) An enhanced contextual fire detection algorithm for MODIS, *Remote Sensing of Environment*, Vol. 87, pp. 273–82.
- Global Climate Observing System GCOS (2010) *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC* (Update). GCOS Report 138. WMO/TD No 1523. World Meteorological Organization (WMO), Geneva, pp. 186: <http://www.wmo.int/pages/prog/gcos/Publications/gcos-138.pdf>
- Haigh, I., Nicholls, R. and Wells, N. (2009) Mean sea level trends around the English Channel over the 20th century and their wider context, *Continental Shelf Research*, Vol. 29, pp. 2083–98.
- Hanafin, J.A., Jennings, S.G., O'Dowd, C.D. and McGrath, R. (in print) *Retrieval and analysis of atmospheric water vapour from GPS receivers*, EPA, Johnstown Castle Estate, Co. Wexford, Ireland.
- Hendrick E. and Black K. G. (eds.) (2007) *Forest, carbon and climate change, local and international perspectives, proceedings of the COFORD conference on 19/09/2007*.
- Hill, A.E., Brown, J., Fernand, L., Holt, J., Horsburgh, K. J., Proctor, R., Raine, R. and Turrell, W.R. (2008) Thermohaline circulation of shallow tidal seas, *Geophysical Research Letters*, Vol. 35, L11605, doi:10.1029/2008GL033459.
- Holden, N.M. (2006) Agriculture, meteorology and water quality in Ireland: a regional evaluation of pressures and pathways of nutrient loss to water. *Biology and Environment: Proceedings of the Royal Irish Academy*, Vol. 106B, 2, pp. 117–33.
- Holden, N. M., Hochstrasser, T., Schulte, R. P. O., Walsh, S. (eds.) (2007) *Making Science Work on the Farm. A Workshop on Decision Support Systems for Irish Agriculture*. Published by Joint Working Group in Applied Agricultural Meteorology: http://www.agmet.ie/Agment_workshop_online_version.pdf http://www.ucd.ie/agmet/Agment_workshop_online_version.pdf
- IPCC (Intergovernmental Panel on Climate Change) (2007) *Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds.) IPCC, Geneva, Switzerland. pp. 104. http://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html
- Keim, C., Eremenko, M., Orphal, J., Dufour, G., Flaud, J.-M., Höpfner, M., Boynard, A., Clerbaux, C., Payan, S., Coheur, P.-F., Hurtmans, D., Claude, H., Dier, H., Johnson, B., Kelder, H., Kivi, R., Koide, T., López Bartolomé, M., Lambkin, K., Moore, D., Schmidlin, F.J. and Stübi, R. (2009) Tropospheric ozone from IASI: comparison of different inversion algorithms and validation with ozone sondes, *Atmospheric Chemistry and Physics*, Vol. 9, pp. 9329–47
- Loeb, N.G. Wielicki, B.A., Su, W., Loukachine, K., Sun, W., Wong, T., Priestly, K.J., Matthews, G., Miller, W.F. and Davies, R. (2007) *Multi-instrument comparison of top-of-atmosphere reflected solar radiation*, *Journal of Climate*, 20, pp. 575–91, doi: <http://dx.doi.org/10.1175/JCLI4018.1>
- Lucey, J. (comp.) (2009) *Water Quality in Ireland 2007–2008: Key Indicators of the Aquatic Environment*. EPA, Johnstown Castle Estate, Co. Wexford, Ireland. pp. 52.
- McElwain, L. and Sweeney, J. (2007) *Key Meteorological Indicators of Climate Change in Ireland*. Environmental Research Centre Report 6, Environmental Protection Agency, Johnstown Castle Estate, Co. Wexford, Ireland. <http://www.epa.ie/downloads/pubs/research/climate/name.23305.en.html>
- McGarrigle, M., Lucey, J., and Ó Cinnéide, M. (2010) *Water Quality in Ireland 2007–2009*, EPA, Johnstown Castle Estate, Co. Wexford, Ireland. pp. 148: <http://www.epa.ie/downloads/pubs/water/waterqua/name.30640.en.html>
- McGovern, E., Monaghan, E., Bloxham, M., Rowe, A., Duffy, C., Quinn, Á., McHugh, B., McMahon, T., Smyth, M., Naughton, M., McManus, M. and Nixon, E. (2002) *Winter Nutrient Monitoring of the Western Irish Sea – 1990–2000*. Marine Environment and Health Series No. 4. 2002, Marine Institute: Dublin.
- McGrath, T., Nolan, G., McGovern, E. (2012) Chemical characteristics of water masses in the Rockall Trough. *Deep Sea Research Part I: Oceanographic Research Papers*, Vol. 61, pp. 57–73.
- McGrath, T., Kivimäe, C., Tanhua, T., Cave, R.R. and McGovern, E. (2012) Inorganic carbon and pH levels in the Rockall Trough 1991–2010, *Deep Sea Research Part I: Oceanographic Research Papers*, Vol. 68, pp. 79–91. doi 10.1016/j.dsr.2012.05.011
- Metz, B. (2010) *Controlling Climate Change*. Cambridge University Press, pp. 359: <http://www.controllingclimatechange.info/>
- Murphy, C., Hall, J. Harrigan, S and Wilby, R.L. (2012) Evaluating long-term trends in mean- and high- river flows using a network of reference stations in Ireland. *Hydrological Sciences Journal* (Submitted).

- Murphy, C., Hall, J., Harrigan, S. and Wilby, R.L. (2012a) *HydroDetect: the identification and assessment of climate change indicators from an Irish Reference Network of River Flow stations*. Environmental Research Centre Report, EPA, Johnstown Castle Estate, Co. Wexford, Ireland. (Submitted).
- Murphy, C., Hall, J. Harrigan, S and Wilby, R.L. (2012b) Evaluating long-term trends in mean- and high- river flows using a network of reference stations in Ireland, *Hydrological Sciences* (Submitted).
- Nardello, I., McGovern, E., Kiviamae, C. and McGrath, T. (2009) Biogeochemical cycles in the Irish marine system. *Irish Ocean Climate and Ecosystem Status Report 2009*. Nolan, G., Gillooly, M. and Whelan, K. (eds.) Marine Institute, Galway, Ireland, pp. 100.
- Nasr, A.E. and Bruen, M. (Under preparation) *Climate Change Indicators in the 7-day Sustained Low Flow (7SLF) series of Irish Rivers*. Environmental Research Centre Report, EPA, Johnstown Castle Estate, Co. Wexford, Ireland.
- New, A.L., Smythe-Wright, D. (2001) Aspects of the circulation in the Rockall Trough, *Continental Shelf Research*, Vol. 21, Nos 8–10, pp. 777–810.
- Ní Longphuirt, S., Stengel, D., O'Dowd C., and McGovern, E. (2010) *Ocean Acidification: An Emerging Threat to our Marine Environment*. Marine Foresight Series No. 6, Marine Institute, Galway, pp. 98.
- Nolan, G., Gillooly, M. and Whelan, K. (eds.) (2010) *Irish Ocean Climate and Ecosystem Status Report 2009*. Marine Institute, Co. Galway, pp 100 <http://hdl.handle.net/10793/81>
- Norris, J.R. and Slingo, A. (2009) Trends in observed cloudiness and Earth's radiation budget in Strüngmann Forum Report. *Clouds in the Perturbed Climate System: Their Relationship to Energy Balance, Atmospheric Dynamics, and Precipitation*. Heintzenberg, J. and Charlson, R.J. (eds.) MIT Press.
- O'Boyle, S., McDermott, G. and Wilkes, R., (2009) Dissolved oxygen in estuarine and coastal waters around Ireland, *Marine Pollution Bulletin*, Vol. 58, pp. 1657–663.
- O'Boyle, S., and Nolan, G. (2010) The influence of water column stratification on dissolved oxygen levels in coastal and shelf waters around Ireland. *Biology and Environment: Proceedings of the Royal Irish Academy*, Vol. 110B, No. 3, pp. 195–209.
- O'Connor, B., Dwyer, E., Cawkwell, F. and Eklundh, L. (2012) Spatio-temporal patterns in vegetation start of season across the island of Ireland using the MERIS Global Vegetation Index, *ISPRS journal of Photogrammetry and Remote Sensing*, Vol. 68, pp. 79–84.
- O'Connor, T.C., S.G. Jennings and O'Dowd, C.D. (2008) Highlights from 50 years of Aerosol Measurements at Mace Head, *Atmospheric Research*, Vol. 90, pp. 338–55.
- O'Doherty, S., Cunbold, D.M. Miller, B.R., Mühle, J., McCulloch, A., Simmonds, P.G., Manning, A.J., Reismann, S., Vollmer, K.K., Grealley, B.R., Prinn, R.G., Fraser, P.J., Steele, L.P., Krummel, P.B., Dunse, B.L., Porter, L.W., Lunder, C.R., Schmidbauer, N., Hermansen, O., Salameh, P.K., Harth, Wang, R.H.J. and Weiss, R.F. (2009) Global and regional emissions of HFC-125 (CHF₂CF₃) from in situ and air archive atmospheric observations at AGAGE and SOGE observatories, *Journal of Geophysical Research*, Vol. 114, D23304.
- O'Doherty, S., Cunbold, D.M. Manning, A., Miller, B.R., Wang, R.H.J., Krummel, P.B., Fraser, P.J., Simmonds, P.G., McCulloch, A., Weiss, R.F., Salameh, P., Porter, L.W., Prinn, R.G., Huang, J., Sturrock, G., Ryal, D., Derwent, R.G. and Montzka, S.A. (2004) Rapid growth of hydrofluorocarbon 134a and hydrochlorofluorocarbons 141b, 142b, and 22 from Advanced Global Atmospheric Gases Experiment (AGAGE) observations at Cape Grim, Tasmania, and Mace Head, Ireland, *Journal of Geophysical Research*, Vol. 109, D06310.
- O'Dowd, C., Cave, R., McGovern, E., Ward, B., Kivimae, C., McGrath, T., Stengel, D. & Westbrook, G. (2011) *Impacts of Increased Atmospheric CO₂ on Ocean Chemistry and Ecosystems*. Marine Institute, Galway.
- Parish, F., Sirin, A., Charman, D., Joosten, H., Minayeva, T., Silvius, M. and Stringer, L. (eds.) (2008) *Assessment on Peatlands, Biodiversity and Climate Change: Main Report*, Global Environment Centre, Kuala Lumpur and Wetlands International, Wageningen.
- Ramonet, M., Ciais, P. Aalto, T., Aulagnier, C., Chevalier, F., Cipriano, D., Conway, T.J., Haszpra, L., Kazan, V. Meinhardt, F., Paris, J.-D., Schmidt, M., Simmonds, P., Xueref-Rémy, I. and Necki, J.N. (2010) A recent build-up of atmospheric CO₂ over Europe. Part 1: observed signals and possible explanations, *Tellus B*, Vol. 62, No. 1, pp. 1–13.
- Rayner N. A. Parker, D.E., Horton, E.B., Folland, C.K., Alexander, L.V., Rowell, D.P., Kent, E.C. and Kaplan, A. (2006) Global analysis of sea surface temperature, sea ice and night marine air temperature since the late nineteenth century, *Journal of Geophysical Research*, Vol. 108, pp. 4407, doi: 10. 1029/2002JD002670.
- Risien, C. M. and Chelton, D.B. (2006) A satellite-derived climatology of global ocean winds, *Remote Sensing of Environment*, Vol. 105, 3, pp. 221–36.

- Rigby, M., Prinn, R.G., Fraser, P.J., Simmonds, P.G., Langenfelds, R.L., Huang, J., Cunnold, D.M., Steele, I.P., Krummel, P.B., Weiss, R.F., O'Doherty, S., Salameh, P.K., Wang, H.J., Harth, C.M., Mühle, J. and Porter, L.W. (2008) Renewed growth of atmospheric methane, *Geophysical Research Letters*, Vol. 35, L22805.
- Rohan, P.K. (1986) *The Climate of Ireland*, 2nd edn. Meteorological Service, Dublin.
- Schroedter-Homscheidt, M., Drews, A. and Heise, S. (2008) Total water vapor column retrieval from MSG-SEVIRI split window measurements exploiting the daily cycle of land surface temperatures, *Remote Sensing of Environment*, Vol. 112, pp. 249–58.
- Schulte, R.P.O., Diamond, J., Finkelle, K., Holden, N.M. and Brereton, A.J. (2005) Predicting the soil moisture conditions of Irish grasslands, *Irish Journal of Agricultural and Food Research*, Vol. 44, pp. 95–110.
- Seiz, G. and Foppa, N. (2007) *National Climate Observing System (GCOS Switzerland)*. MeteoSwiss and ProClima, pp. 92 <http://www.proclim.ch/4dcgi/proclim/en/Media?1022>
- Siliang, L., Ronggao, L. and Yang, L. (2010) Spatial and temporal variation of global LAI during 1981–2006, *Journal of Geographical Sciences*, Vol. 20, 3, pp. 323–32.
- Silke, J., O'Beirn, F. and Cronin, M. (2005) Karenia: An exceptional dinoflagellate bloom in western Irish waters, summer 2005. Marine Environment and Health Series 21. Marine Institute, Galway, Ireland, pp. 44.
- Stanhill, G. (1998) Long-term trends in, and spatial variation of, solar irradiances in Ireland, *International Journal of Climatology*, Vol. 18, No. 9, pp. 1030–50.
- Sweeney, J., Donnelly, A., McElwain, L., and Jones, M. (2002) *Climate Change Indicators For Ireland, ERTDI Report 2*, Environmental Protection Agency, Johnstown Castle Estate, Co. Wexford, Ireland: <http://www.epa.ie/downloads/pubs/research/climate/name.12157.en.html>
- Sweeney, J., Albanito, F., Brereton, A., Caffarra, A., Charlton, R., Donnelly, A., Fealy, R., Fitzgerald, J., Holden, N., Jones, M. and Murphy, C. (2008) *Climate Change – Refining the Impacts for Ireland*. Environmental Protection Agency, Johnstown Castle Estate, Co. Wexford, Ireland. <http://www.epa.ie/downloads/pubs/research/climate/name.26008.en.html>
- Tedd, K., Misstear, B., Coxon, C., Daly, D., Hunter-Williams, T., Craig, M. and Mannix, A. (2010) *Review of Groundwater Level Data in the South Eastern River Basin District*. STRIVE Report Prepared for the EPA and the GSI by Trinity College, Dublin.
- Thomas, P., Cox, S. and Tindal, A. (2009) *Long-Term Wind Speed Trends In Northwestern Europe*. Garrad Hassan and Partners Ltd, Bristol, UK: <http://www.gl-garradhassan.com/en/index.php>
- Tomlinson, R.W. (2005) Soil carbon stocks and changes in the Republic of Ireland, *Journal of Environmental Management*, Vol. 76, pp. 77–93.
- Tripathi, O.P., Jennings, S.G., O'Dowd, C.D., Colman, L., Leinert, S., O'Leary, B., Moran, E., O'Doherty, S.J. and Spain, T.G. (2010) Statistical analysis of eight surface ozone measurement series for various sites in Ireland, *Journal of Geophysical Research*, Vol. 115, D19302, doi:10.1029/2010JD014040.
- Tripathi, O.P., Jennings, S.G., Colman, L., Lambkin, K., Moran, E. and O'Dowd, C.D. (2012) *Ozone levels, changes and trends over Ireland – an integrated analysis*. EPA, pp. 137: <http://www.epa.ie/downloads/pubs/research/air/name.33696.en.html>
- Tripathi, O.P., Jennings, S.G., O'Dowd, C.D., Lambkin, K. and Moran, E. (Submitted) Recent trends in stratospheric ozone at a mid-latitude observing station at Valentia, Ireland (51.940 N, 10.250 W) through ground-based and ozonesonde measurements from 1994 to 2009. *Journal of Atmospheric Science* (Submitted).
- Vaquier-Sunyer, R and Duarte, C.M. (2008) Thresholds of hypoxia for marine biodiversity, *Proceedings of the National Academy of Sciences*, Vol. 105, No. 40.
- Wheeler, A.J., Beyer, A., Freiwald, A., de Haas, H., Huvenne, V.A.I., Kozachenko, M., Olu-Le Roy, K. and Opperbecke, J. (2007) Morphology and environment of cold-water coral carbonate mounds on the NW European margin, *International Journal of Earth Science*, Vol. 96, 37–56, Series: 1.
- Wheeler, A.J., M. Kozachenko, L.-A. Henry, A. Foubert, H. de Haas, V.A.I. Huvenne, D.G. Masson, K. Olu-Le-Roy (2011) The Moira Mounds, small cold-water coral banks in the Porcupine Seabight, NE Atlantic: Part A—an early stage growth phase for future coral carbonate mounds? *Marine Geology*, Vol. 282, Nos 1–2, pp. 53–64.
- Wilson, J.B. (1979) The distribution of the coral *Lophelia pertusa* (L.) [*L. prolifera* (Pallas)] in the North East Atlantic, *Journal of the Marine Biological Association of the UK*, Vol. 59, pp. 149–64.
- Woodworth, P.L., Teferle, F.N., Bingley, R.M., Shennan, I. and Williams, S.D.P. (2009) Trends in UK mean sea level revisited, *Geophysical Journal International* Vol. 176, pp. 19–30.
- Woolf, D.K., P.G. Challenor and Corron, P.D. (2002) The variability and predictability of North Atlantic wave climate, *Journal of Geophysical Research*, Vol. 107, p. 3145, doi:10.1029/2001JC001124.
- Zhang, X., Liang, S., Wang, K., Li, L. and Gui, S. (2010) Analysis of global land surface shortwave broadband albedo from multiple data Sources, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, Vol. 3, No. 3, pp. 296–305.

Acronyms

| | |
|--------|--|
| AGAGE | Advanced Global Atmospheric Gases Experiment |
| AMO | Atlantic Multidecadal Oscillation |
| AVHRR | Advanced Very High Resolution Radiometer |
| BGS | Beginning of Growing Season |
| BODC | British Oceanographic Data Centre |
| C-CAPS | Centre for Climate and Air Pollution Studies |
| CCI | Climate Change Initiative |
| CCIP | Climate Change Impacts on Phenology |
| CDNC | Cloud Droplet Number Concentration |
| CEA | Atomic Energy Commission (France) |
| CFC | Chloroflourocarbon |
| Chl-a | Chlorophyll a |
| CLS | Collecte Localisation Satellites |
| CMRC | Coastal and Marine Research Centre |
| CNES | Centre National d'Etudes Spatiales |
| CNRS | Centre National de la Recherche Scientifique |
| CORINE | Coordinated Information on the European Environment |
| DAFM | Department of Agriculture Food and Marine |
| DECC | Department of Energy and Climate Change |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DIC | dissolved inorganic carbon |
| DMSP | Defense Meteorological Satellite Programme |
| EC | European Commission |
| ECV | Essential Climate Variable |
| ENSO | El Niño–Southern Oscillation |
| EPA | Environmental Protection Agency |
| ESA | European Space Agency |
| ESB | Electricity Supply Board |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| FAPAR | Fraction of Absorbed Photosynthetically Active Radiation |
| GAW | Global Atmosphere Watch |
| GCOS | Global Climate Observing System |
| GEOSS | Global Earth Observation System of Systems |
| GHG | Green House Gases |
| GLOSS | Global Sea Level Observing System |
| GMES | Global Monitoring for Environment and Security |
| GPM | Global Precipitation Measurement |

| | |
|------------------|---|
| GPS | Global Positioning System |
| GRACE | Gravity Recovery and Climate Experiment |
| GSN | Global Surface Network |
| HAB | Harmful Algal Bloom |
| HCFC | Hydrochlorofluorocarbons |
| hPa | hectoPascal |
| ICES | International Council for Exploration of the Sea |
| ICOS | International Carbon Observing System |
| IPCC | Intergovernmental Panel on Climate Change |
| LAI | Leaf Area Index |
| LSCE | Laboratoire des Sciences du Climat et l'Environnement |
| LSW | Labrador Sea Water |
| LUCAS | Land Use and Cover Area frame Survey |
| MACC | Monitoring Atmospheric Composition and Climate |
| MERIS | Medium Resolution Imaging Spectrometer |
| MI | Marine Institute |
| MODIS | Moderate Resolution Imaging Spectroradiometer |
| MOLAND | Monitoring Land Use/Cover Dynamics |
| MSL | Mean Sea Level |
| NAC | North Atlantic Current |
| NASA | National Aeronautics and Space Administration |
| NBDC | National Biodiversity Data Centre |
| NOAA | National Oceanic and Atmospheric Administration |
| NPP | National Polar-orbiting Partnership |
| NUIG | National University Ireland Galway |
| OMPS | Ozone Mapper Profiler Suite |
| OPW | Office of Public Works |
| pCO ₂ | partial pressure of carbon dioxide |
| PFC | Perfluorocarbons |
| pH | measure of acidity in a solution |
| POL | Proudman Oceanographic Laboratory |
| Ppb | parts per billion |
| Ppm | parts per million |
| Psu | practical salinity unit |
| SAC | Special Area of Conservation |
| SAHFOS | Sir Alister Hardy Foundation for Ocean Science |
| SCIAMACHY | Scanning Imaging Absorption spectrometer for Atmospheric Chartography |
| SFPA | Sea Fisheries Protection Authority |
| SLR | Sea Level Rise |
| SMD | Soil Moisture Deficit |
| SMOS | Soil Moisture Ocean Salinity |
| SOC | Soil Organic Carbon |
| SPA | Special Protection Area |
| SPOT | Système Pour l'Observation de la Terre |
| SST | Sea Surface Temperature |

| | |
|--------|---|
| SWH | Significant wave height |
| TA | Total alkalinity |
| TCD | Trinity College Dublin |
| Tg | Teragrams (equivalent to 1 tonne) |
| TM | Thematic Mapper |
| TUCSON | The Unified Climate and Synoptic Observation Network |
| UCC | University College Cork |
| UK | United Kingdom |
| UN | United Nations |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UTC | Coordinated Universal Time |
| UVSQ | Université de Versailles Saint-Quentin-en-Yvelines |
| WOCE | World Ocean Circulation Experiment |



Appendix 1: List of Authors

| | | |
|------------|----------|--|
| Black | Kevin | University College Dublin & Forest, Environmental Research and Services Ltd |
| Cawkwell | Fiona | University College Cork (UCC) |
| Coll | John | National University of Ireland Maynooth |
| Cusack | Caroline | Marine Institute |
| Devoy | Robert | Coastal and Marine Research Centre, UCC |
| Dwyer | Ned | Coastal and Marine Research Centre, UCC |
| Eaton | James | University College Cork (now at TerraCarbon LLC, USA) |
| Gault | Jeremy | Coastal and Marine Research Centre, UCC |
| Holliday | Penny | National Oceanography Centre, UK |
| Jennings | Gerard | National University of Ireland Galway |
| Kozachenko | Max | University College Cork |
| Lambkin | Keith | Met Éireann |
| McGovern | Evin | Marine Institute |
| McGrath | Triona | Marine Institute |
| Murphy | Conor | National University of Ireland Maynooth |
| Nolan | Glenn | Marine Institute |
| O'Boyle | Shane | Environmental Protection Agency (EPA) |
| O'Doherty | Simon | University of Bristol |
| O'Donoghue | Aidan | Coastal and Marine Research Centre, UCC (now at St Colman's College, Fermoy, Co. Cork) |
| O'Dowd | Colin | National University of Ireland Galway |
| O'Connor | Brian | Coastal and Marine Research Centre, UCC (now at Environmental Research & Assessment, UK) |
| Ramonet | Michel | Laboratoire des Sciences du Climat et de l'Environnement |
| Regan | Eugenie | National Biodiversity Data Centre |
| Saunders | Matthew | University College Dublin |
| Scarrott | Rory | Coastal and Marine Research Centre, UCC |
| Silke | Joe | Marine Institute |
| Simmonds | Peter | University of Bristol |
| Walsh | Séamus | Met Éireann |