Comhshaol, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government

Irelands response to the SBSTA invitation to submit additional information regarding the implementation of the Global Climate Observation Systems (GCOS) plan.

September 2008

Additional information on Ireland's activities on the implementation of the Global Climate Observation System (GCOS)

1 Introduction

This document outlines Ireland's contribution to development of Global Climate Observation System (GCOS). It was produced in response to the SBSTA invitation to Parties to submit to the secretariat, by 15 September 2008, additional Information on their national activities with respect to national action on the GCOS implementation plan.

This document was compiled revised UNFCCC reporting guidelines on global climate change observing systems. For convenience the relevant reporting guidelines section numbers are included at the start of a number of responses. Therefore this report should be read in conjunction with the reporting guidelines.

Chapter 1: Common issues

In order to respond to the GCOS implementation plan, the Environmental Protection Agency (EPA) (www.epa.ie) the Marine Institute (MI) (www.marine.ie) and Met Éireann (www.met.ie) established an assessment group to review the GCOS plan and its implementation in Ireland. It also aimed to determine and prioritise those steps necessary for full implementation of the GCOS plan. The outcome from this process was published in 2008 (Dwyer, 2008)[1]. This group is continuing to coordinate the development of climate observations in Ireland.

(6a)The national Climate Change Strategy (NCCS) 2007-2012 (DoELHG, 2007)[2] reiterates Ireland's commitment to sustaining an adequate and modern capability for climate observations that is in line with the Global Climate Observing System requirements.

(6b) No policy level barrier exist in relation to exchange of data on essential climate variables.

(6c) Met Éireann acts as national GCOS co-ordinator and participates in the European COST action ES0601 (2007-2011) which is looking to establish a coordinated approach to harmonisation of methodologies, in order to correct in-homogeneities in data. The NCCS indicates that Met Éireann and other state agencies including the Marine Institute and the Irish Environmental Protection Agency (EPA) will work together to enhance the climate observation network and utilise the most advanced data collection and communication systems for these purposes

(6d) Data are held in national and international databases and the integrity of data is reviewed on a regular basis.

(7) Data collected in Ireland are submitted to relevant international data centres and bodies. It does not currently host any international centre.

(8) Ireland's development assistance is focused on the Least Developed Countries, particularly those in sub-Saharan Africa. Ireland has bilateral development programmes with Lesotho, Ethiopia, Mozambique, Tanzania, Uganda, Zambia, Vietnam, Timor Leste and Malawi. Irish Aid also has programmes in South Africa, Liberia and Sierra Leone and operates throughout the world via the NGO partners and the UN. Ireland's assistance programme supports a wide range of activities, programmes and sectors, which have benefits for countries addressing climate change.

Many activities related to agriculture, health, infrastructure, water resource management and disaster prevention have positive impacts in terms of adaptation to climate change. Ireland also supports climate change activities through multilateral programmes and funds (including the Least Developed Countries Fund and the Special Climate Change Fund) and through support to international organisations and agencies e.g. the UN Institute for Training and Research, the World Conservation Union, the International Institute for Environment and Development).

EUMETSAT, of which Ireland is a member, contributes to the African Monitoring of the Environment for Sustainable Development (AMESD) project. AMESD, the follow-on initiative

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[1] Dwyer, N., 2008, Climate Change - Implementation of the Global Climate Observing System in Ireland , Environmental Research Centre Report 8, Environmental protection Agency, Johnstown Castle, http://www.epa.ie/downloads/pubs/research/climate/name,24240,en.html

[2] Department of the Environment, Heritage and Local Government, 2007, National Climate Strategy 2007-2012, PRN:A7/0397, Custom House, Dublin 1.

to Preparation for the Use of Meteosat Second Generation in Africa (PUMA), is the African component of GMES.

(9) Ireland supports a number of research activities on paleo-climate including high-resolution analyses of sediments and pollens in remote lakes and peatland areas. These analyses have revealed changes in climate since the Holocene and have been reviewed by Sweeney et al.[3] (2007).

Chapter 2: Atmospheric essential climate variables

(12) Ireland has three main groupings of meteorological observing stations:
• 25 Synoptic or real-time automatic weather stations (AWS)
• 67 Climate stations
• 537 Rainfall stations including the Synoptic, AWS and Climate stations

The synoptic and AWS stations operated by Met Éireann provide observations of the standard meteorological parameters at hourly or better time resolution. In the case of 14 stations, data is collected at one-minute resolution. This network consists of 8 fully manned stations, including 5 airports, one partially manned station with co-located AWS and 16 unmanned AWS.

All climate stations return daily values of Dry, Wet, Max and Min temperatures and rainfall. 17 of these also report daily sunshine. Twenty two report soil temperatures at 3 depths while 10 report some soil temperature data.. Thirteen report earth temperatures at 3 depths while 8 report some earth temperature data. The daily readings are taken at 0900 UTC. Readings are taken by private individuals, Government bodies, local authorities, schools and colleges, etc.

A total of 509 stations report daily rainfall at 0900 UTC and 28 stations report monthly falls. Readings are provided by a variety of bodies and private individuals in the same way as for climate stations.

In addition, there are 34 daily and 3 weekly Dines Tilting Syphon Rain Recorders in operation at various locations. There are also 11 evaporation stations using Class A pan evaporimeters.

Data from all the above networks are archived by Met Éireann. These data are quality controlled and kept under continuous scrutiny by the Climatology and Observations Division. The stations are visited regularly by inspectors to ensure, as much as possible, that the siting of instruments and the accuracy of records conform to WMO standards. Records from some stations span more than 100 years. Much of the data since 1941 from the above stations are held in electronic form.

[3] Sweeney, J. & McElwain, L., 2007, Implications of the EU Climate Protection Target for Ireland Environmental Research Centre - ERC Report 5**,** Environmental protection Agency, Johnstown Castle**,** **http://www.epa.ie/downloads/pubs/research/climate/name,14449,en.html**

Table 1a National contributions to the surface-based atmospheric essential climate variables

Contributing networks specified in the GCOS implementation plan	ECVs	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
GCOS Surface Network (GSN)	Air temperature	2	2	2	2	2
	Precipitation	2	2	2	2	2
Full World Weather Watch/Global Observing System (WWW/GOS) surface network	Air temperature, air pressure, wind speed and direction, water vapour	2	2	2	2	2
Baseline Surface Radiation Network (BSRN)	Surface radiation	0	0	1	0	0
Solar radiation and radiation balance data	Surface radiation	21	0	22	7	7
Ocean drifting buoys	Air temperature, air pressure					
Moored buoys	Air temperature, air pressure	6	6	6	6	6
Voluntary Observing Ship Climate Project (VOSClim)	Air temperature, air pressure, wind speed and direction, water vapour					
Ocean Reference mooring Network and sites on small isolated islands	Air temperature, air pressure, wind speed and direction, water vapour					

Table 1b National contributions to the upper-air atmospheric essential climate variables

Contributing networks specified in the GCOS implementation plan	ECVs	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
GCOS Upper Air Network (GUAN)	Upper-air temperature, upper-air wind speed and direction, upper–air water vapour	1	1	1	1	1
Full World Weather Watch/Global Observing System (WWW/GOS) Upper Air network	Upper-air temperature, upper-air wind speed and direction, upper–air water vapour	1	1	1	1	1

Table 1c. National contributions to the atmospheric composition

Contributing networks specified in the GCOS implementation plan	ECVs	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
GCOS Upper Air Network (GUAN)	Upper-air temperature, upper-air wind speed and direction, upper–air water vapour	1	1	1	1	1
Full World Weather Watch/Global Observing System (WWW/GOS) Upper Air network	Upper-air temperature, upper-air wind speed and direction, upper–air water vapour r	1	1	1	1	1
WMO/GAW ozone sonde network	Ozone	1	1	1	1	1
WMO/GAW column ozone network	Ozone	1	1	1	1	1
WMO/GAW Aerosol Network	Aerosol optical depth	2	2	2	2	2
	Other aerosol properties	2	2	2	2	2

(14) Ireland is a member of EUMETSAT and the European Space Agency Earth Observations programme and support the EU Global Monitoring for Environment and Security (GMES) programme. GMES is the main European contribution to Group on Earth Observations plan to establish the GEOSS.

(15a) The GCMPs are being applied. However, data homogeneity checks are not carried out all the time on all variables. Such checks will be carried out in future subject to the availability of the necessary resources.

(15b) Not applicable

(15c) 3-hourly mean sea-level pressure and wind speed and direction data from GSN stations are supplied to the relevant data centres.

(15d) Ireland supports activity in the area of high-altitude, high-quality radiosondes via its membership of WMO.

(15e) Radiosondes are deployed 4 times daily from the Valentia Observatory. Measurements are in full compliance with coding conventions. Almost all GCMPs are implemented.

(15f) Metadata records for radiosonde observation are being submitted to appropriate International Data Centres.

(15g) Ireland supports activity in this area via its membership of WMO and has established measurements at two linked sites on the west coast.

(15h) Measurements of atmospheric composition ECVs (Aerosol properties, Carbon dioxide, Methane, other long-lived greenhouse gases and ozone) are carried out at one or other of the Global Atmospheric Watch (GAW) stations located at Mace Head and Valentia Observatory. These are carried out as part of national and international programmes. These data are submitted to the relevant data centre.

Chapter 3: Oceanic essential climate variables

As part of the marine Institute's Climate Change Programme (2007-2009), a review of all existing in-situ observation systems is being carried out in order to determine if they are sufficient for climate monitoring purposes. A report on this is expected in late 2009.

Table 3a National contributions to the oceanic essential climate variables - surface

Contributing networks specified in the GCOS implementation plan	ECVs	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
Global surface drifting buoy array on 5 x5 degree resolution	Sea surface temperature, sea level pressure, position-change-based current	0	0	0	0	0
GLOSS Core Sea-level Network	Sea level	2	2	2	2	1
Voluntary observing ships (VOS)	All feasible surface ECVs	15	15	15	15	15
Ship of Opportunity Programme	All feasible surface ECVs	0	0	0	0	0

Table 3b National contributions to the oceanic essential climate variables – water column

Contributing networks specified in the GCOS implementation plan	ECVs	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
Global reference mooring network	All feasible surface and subsurface ECVs	6	6	6	6	6
Global tropical moored buoy network	All feasible surface and subsurface ECVs	0	0	0	0	0
Argo network	Temperature, salinity, current	4	4	12	0	0
Carbon inventory survey lines	Temperature, salinity, ocean tracers, biogeochemistry variables	0	0	0	0	0

(20a) Meteorological data and associated metadata are collected on the two national research vessels using the BATOS VOS system. Metadata are managed within an information system complying with international metadata standards.

(20b**)** It is anticipated that high-frequency sea-level data from 8 gauges will be delivered to the European Sea Level Service (ESEAS) by late 2008. ESEAS is an element of GLOSS. Information on current tidal heights can be accessed via the recently established Irish National Tide Gauge Network (http://www.irishtides.ie) which has 15 reporting nodes as of June 2008. It is anticipated that up to 40 nodes will be operational by 2010.

(20c) Not relevant

(20d) Sea-surface salinity is collected by The *Celtic Voyager* and the *Celtic Explorer* research vessels only (10 second interval). These vessels spend over 305 and 250 days at sea respectively each year (2007 figures). The collected salinity data are quality controlled, gridded and archived in monthly data files.

A scoping study is being carried out regarding the possibility of installing a Expendable Bathy Thermograph (XBT) system and Continuous Plankton Recorder (CPR) on a vessel which sails from Foynes, Co. Limerick to Reykjavik, Iceland. Installation of such a device is subject to funding being made available.

(20e) During 2007, NUI, Galway deployed a pCO_2 device on the Celtic Explorer research vessel on a trial basis. There are plans to measure *p*CO2 from an inshore buoy offshore of Mace Head (Co. Galway) in 2008. Discussions are ongoing regarding the use of pCO_2 sensors on the national met buoys described in chapter 1.

(20f) Ireland supports the implementation of a wave measurement component as part of the Surface Reference Mooring Network.

(20g) not relevant

(20h) Annual oceanographic surveys to full water column depth are carried out to the west of Ireland. Data are submitted to the Irish Data Centre and ICES

(20i) Ireland supports implementation of the SOOP XBT/XCTD trans-oceanic sections

(20j) The Marine Institute monitors phytoplankton under a national programme which has been in place since the 1980s. Samples are taken at a number of designated sites and the various species present are analysed. If any harmful species are detected these are reported via the Institute's website.

Water samples are collected on an ongoing basis by the Marine Institute and analysed for nutrient content, specifically dissolved Nitrate and Nitrite, Phosphate, Silicate, and Ammonium. Winter sampling has been carried out in the Irish Sea since 1991. In recent years the measurements have been extended to cover more of the Celtic Sea and the western Irish Shelf.

It is planned to install up to five Mobilis coastal buoys over the coming years at a number of locations surrounding the coast. Water quality measurements will be made in addition to meteorological and oceanographic measurements.

(20k) Paper records of ship reports are being digitised, quality-controlled and inserted into an electronic database by Met Éireann. This work is expected to be completed by the end of 2008.

The database has 2.5 million records, spanning just over 150 years and covers a broad area around Ireland. These data can be accessed on request to Met Éireann.

(20l) O24 : (sea ice) not relevant for Ireland.

The marine Institute uses the ROMS model in a number of its regional modelling activities (e.g. salinity, SST, significant wave height).

Chapter 4: Terrestrial essential climate variables

The national climate observations coordination group described in chapter 1 is producing a plan on national climate observation needs, which includes a number of actions to be taken in the terrestrial observations sphere. This report will be published before the end of 2008.

Activities related to the collection of information on hydrological variables are coordinated through a Hydrology working group, whose members are made up of the key agencies involved in this sector the Environmental protection Agency and the Office of Public Works.

A land cover interest group has met regularly in relation to the production of the European land cover map (CORINE) for 2006 and is now exploring a range of issues related to the collection of land information.

Ireland does not contribute to the river discharge or lake level networks as its rivers and lakes are not considered under GCOS reporting requirements. The other variables mentioned in table 5 are not of relevance to Ireland.

(25a) not relevant

(25b) The EPA coordinates the monitoring of groundwater. It is planned to have 85 groundwater level monitoring sites established by the end of 2008. A subset of these will be selected for long-term climate monitoring purposes.

(25c,d,e,f) are not relevant for Ireland

(25g) Ireland engages with international programmes on re-analysing historical data concerning the terrestrial ECVs

5: Additional information

Ireland has an active climate research programme which enables analysis of climate variables and allows for supplementary observations to enhance understanding of climate change. Details of this programme are available from www.epa.ie. Ireland is also active in linked regional research programmes e.g. the EU Framework programme.

6: Conclusions

Ireland has provided a response to actions required to develop the Global Climate Observation Systems and will continue to review and develop necessary observation capacity as required**.** ECV data collected are available to international bodies and research groups.