

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

Data Distribution Centre (DDC)

Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA)

Among its other activities, the IPCC has established a Data Distribution Center (DDC) to facilitate the wide availability of climate change related data and scenarios to enable research on climate change, impacts, and response options. These data are of high utility to the SBSTA 5-year program of work on impacts, vulnerability and adaptation to climate change. This brief report describes the center's current data holdings and plans for future additions to the DDC, if adequate resources be secured to support these additional activities.

Most of the holdings and resources of the DDC are relevant to the first five areas of work detailed in the Nairobi Work Programme (NWP) on impacts, vulnerability and adaptation to climate change. These include: methods and tools; data and observations; climate modeling, scenarios, and downscaling; climate related risks and extreme events; and socio-economic information.

Overview

The IPCC Data Distribution Center (DDC) <http://www.ipcc-data.org/index.html> provides a variety of data, information, and technical guidelines to support analysis of climate change, impacts, and response options including adaptation. The data include emissions data and scenario, observed climatologies, climate change scenarios, and other socio-economic and environmental data and are described more completely below.

The DDC is a distributed data archive operated by the British Atmospheric Data Centre, the World Data Center Climate at the Max-Planck-Institute for Meteorology in Hamburg, Germany, and the Socioeconomic Data and Applications Center (SEDAC) of the Center for International Earth Science Information Network (CIESIN) at Columbia University, New York, USA. Each of these institutions has taken on responsibility for managing access to a subset of the data and information provided by the DDC. The operations of the DDC are primarily funded through voluntary "in-kind" contributions from governments that support the participating data centers. Work at the BADC is funded by the UK Department for Environment Food and Rural Affairs (DEFRA). SEDAC is funded by the U.S. National Aeronautics and Space Administration (NASA).

The Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA) was established in September 1996 and provides oversight for the DDC. The TGICA also provides technical guidelines for impacts, adaptation, and vulnerability assessment through the DDC and organizes occasional workshops and other activities to facilitate research and assessment. Approximately twenty scientists from a diverse set of countries serve on the TGICA in their individual capacities (see Appendix 1 for the current TGICA membership list). The TGICA reviews the data and other information posted on the DDC to ensure its suitability

for use in impacts, adaptation, vulnerability, and mitigation research, and also develops technical guidelines and other materials to support users.

The DDC holdings are already accessed by many different users. For example, the main site (www.ipcc-data.org) was visited by 5731 distinct servers from 99 countries during February 2007.

The data holdings fall into two broad categories: (1) climate data and climate-change scenarios; and (2) socio-economic and environmental data and scenarios. The holdings are described in greater detail below. There are also tools for intercomparing model-based projections of future climate conditions for major world regions and data visualization. The data and information on the DDC are available free of charge to all users, although registration is encouraged.

Data delivery is primarily through internet-based transfer. Of special note to users in developing countries who may lack fast and reliable access to the internet, the DDC does provide a “burn-to-DVD” data delivery method.

Methods and tools

The NWP includes an area of work that focuses on methods and tools for impacts, adaptation, and vulnerability analysis. The TGICA has prepared a series of technical guidelines that are available through the DDC to support (1) use of scenarios in impacts, adaptation, and vulnerability assessment (2) application of dynamical downscaling methods (regional climate models); and (3) use of statistical downscaling methods. Additional guidelines are under development for (4) assessment of sea-level rise impacts and (5) socio-economic data and scenarios.

Climate observations

These data holdings are particularly relevant to the NWP work area focused on observational data. The DDC provides a climatology of observed surface temperature, precipitation, water vapour pressure, cloud cover, wind speed, solar radiation, and the number of wet days or frost days per month. These data are provided as decadal and 30 year means for each month. The climate record is vital both as a means of validating the models used to predict future climate and as a means directly evaluating the variability of the Earth’s climate. The climate observations distributed by the DDC have been provided by the Climate Research Unit (CRU), University of East Anglia.

Visualisation software provides a graphical view of the observed climatology. This is described in more detail in the section on model-based projections below.

Data sets are being updated to reflect recent work from the IPCC Fourth Assessment Report (AR4).

Socio-economic and environmental data and scenarios

The DDC also includes data holdings relevant to the NWP work area on socio-economic information. The information distributed by the DDC includes two different types of socioeconomic and environmental data: 1) “baseline” data intended to provide a consistent starting point and reference period for assessing change over time; and 2) “scenario” data that represent plausible pathways for future socioeconomic development. The socioeconomic scenario data are critical inputs into models that try to assess human impacts on the environment (e.g., through greenhouse gas emissions and land use change) and are also vital for characterizing the importance of estimated future impacts of climate change on human systems in the context of future socioeconomic conditions.

The baseline data are taken from the 1998 IPCC report, *The Regional Impacts of Climate Change: An Assessment of Vulnerability*, and provide a snapshot of national-level conditions during the 1990s related to population, development, natural resources, and environment. Data are provided in tabular and spreadsheet form for most countries of the world.

The socioeconomic scenario data are based on two different IPCC reports: 1) the 1992 *Supplementary Report to the IPCC Assessment*; and 2) the *Special Report on Emission Scenarios* (SRES) published in 2000. The so-called “IS92” scenarios served as important reference scenarios for several IPCC assessments and for many years of research on climate impacts. Working closely with the TGICA and several of the original authors, SEDAC carefully reconstructed and reformatted the IS92 scenario data and associated documentation, since no authoritative digital version had been created after the original report was published. SEDAC also had worked closely with the SRES team during the development of the SRES scenarios to archive and help document the scenario datasets. The DDC is therefore able to provide access to all of the SRES scenario data from six different modeling groups, including the SRES “marker” scenarios and several supplementary datasets on fluor gases and gridded emissions. The distributed version of these data contains corrections that were not reflected in the published SRES volume. These data continue to be widely used and cited in the scientific literature regarding future climate change.

The socio-economic data holdings of the DDC are currently being expanded.

Model-based projections

The NWP includes a work area focused on climate modeling, scenarios, and downscaling. The data described in this section of this report respond to the needs outlined in this area.

Output from GCM experiments featured in IPCC reports is available as decadal and 30 year means for each month. Visualisation software on the web site can display both observational and model climatologies and also show differences. From GCMs run with IS92 scenarios, observed surface temperature, precipitation, water vapour pressure, cloud cover, wind speed, solar radiation, wet days or frost days per month are available. From GCMs run with the SRES scenarios, surface temperature, precipitation, water vapour pressure, wind speed, cloud cover and soil moisture are available.

The DDC web site provides visualizations of decadal and 30-year climatologies of monthly mean climate data from GCM output and from observations. Users can produce plots of their chosen region of interest, or display time series of regional means. The visualization software is being upgraded to improve its flexibility and robustness. A user survey will be conducted to find out more about users requirements.

More detailed climate model output, as monthly means, is available from the GCM part of the DDC (services run by the World Data Center Climate (WDCC) at the Max Planck Institute for Meteorology in Hamburg). The data provided includes a wide range of climate parameters. Data are archived as time series of individual variables in the database system of the WDCC. The smallest data granules are single monthly mean fields which can be identified and downloaded by the web-interface of the WDCC. The DDC GCM data portal can be directly accessed by resolving the URL <http://ipcc.wdc-climate.de> and following the link "DDC". The central GCM data entry page provides data portals for DDC data of the Second, the Third and the Fourth IPCC Assessment Report. The IPCC Second Assessment Report used GCM results from 6 modeling groups. In the Third Assessment report this was expanded to 7, and to 17 in the Fourth Assessment Report.

For scientific groups who do not have the capability to download these data, a subset is made available on DVD media. Due to the amount of data this service can only provide the "core" variables of the DDC data sets, to subregions of the globe and a single run even if ensembles are available. Data DVDs can be ordered via [Http://ipcc.wdc-climate.de](http://ipcc.wdc-climate.de) and following the link "[Order IPCC-AR4 Data on DVD](#)". The data DVDs are disseminated "at cost."

Assessing variability and uncertainty in projected future climate

Under the auspices of the TGICA, the Finnish Environment Institute has prepared a report that may be of assistance to researchers wishing to select climate scenarios for assessing the potential impacts of climate change. The report is available through the DDC and provides useful background information for evaluating the projections of different climate scenarios prepared with a variety of GMCs against natural variability. The "scatter plots" for major world regions compare temperature and precipitation for different seasons in several future time slices against observed natural variability. The plots thus enable researchers and other users to compare the projections produced by different models for various emissions scenarios, and to compare these changes against expected natural variability. See http://www.ipcc-data.org/sres/scatter_plots/scatterplots_home.html.

Potential future plans

The three institutions jointly operating the DDC have voluntarily taken on responsibility for managing the DDC. In addition, other governments have supported the preparation of the technical guidelines and other activities such as workshops. All support is "in-kind," i.e., the TGICA and DDC do not have a centralized budget. The DDC's ability to carry out the additional activities briefly described below will be contingent on both the IPCC's approval and the ability to garner additional in-kind contributions to carry out the work.

Expanding support for the five-year plan of action on adaptation

Up to the present, the DDC has primarily been oriented towards supporting users in the research community who are conducting studies of impacts, adaptation, and vulnerability that will subsequently be assessed by IPCC Working Group II. As indicated above, the data and other information are potentially useful to those working under the NWP, as well as to others preparing national reports and other communications on these topics. The TGICA is currently interacting with potential users from these groups to better understand their data needs and support requirements to determine what would be required to make these resources more useful to them. Any expansion of the scope of the DDC to support these users would need to be approved by the IPCC and adequately supported.

Development and provision of appropriate data products

Currently, climate and related socio-economic data and scenarios are frequently not available at the time and spatial scales needed for research on impacts and adaptation in developing and transition-economy countries. For example, for climate scenarios, GCM data tends to be made available in the form of monthly means of selected variables. This poses a notable limitation on the many aspects of the impacts research and evaluation of adaptation options. TGICA is currently working to identify and develop simple data sets and products that would be more accessible and appropriate for use in computationally-limited developing and transition-economic settings.

Capacity building

TGICA and the DDC do not conduct training programs. With IPCC approval, the TGICA has, however, developed a framework for capacity building in developing and transition-economy countries. The TGICA framework relies on establishment of a network of post-doctoral or early career scientists located in (1) capacity rich developed countries, (2) capacity “middle class” developing countries, (3) and capacity/resource limited developing countries. The framework stresses mentorship and guidance to provide practical experience in developing and disseminating appropriate data products based on emerging resources. With support from researchers and institutions in capacity rich countries, climate change data resources would be accessible to regional scientists in the “capacity middle class,” who would be responsible for working with scientists and users from “capacity limited” countries to create data resources relevant to their needs. Currently, several institutions such as the System for Analysis, Research, and Training (START) are exploring creation training and fellowship programs that are based on the TGICA model.

Further information

For further information about the DDC or the activities of the TGICA, please contact:
http://www.ipcc-data.org/ddc_feedback.html.