Climate4impact: a new gateway for the global climate impact community

Over the years, the community of climate researchers has made great efforts to make their global climate models (GCM) comparable and usable by many. An important step in this process is the development of a data portal from which all these models can be easily accessed. Recently, a team within the European Network for Earth System Modelling (ENES) developed the Portal Interface for the Climate Impact Communities to do just that. While the website, http://climate4impact.eu/, is still in its evaluation phase, researchers throughout the world can already use and search the data made available through the portal.

Meteorological and research institutes have collected impressive amounts of climate data, but when researchers want to access that information, they have to contact each organisation separately. Further, some institutions lack a gateway from which data can be properly downloaded.

The climate4impact website, a web interface for climate data built on the Earth System Grid Federation (ESGF) infrastructure, offers a distributed search which gives the user the possibility to look at different databanks in a single session. The portal allows users to access and download data from over eighty global and (to a lesser extent) regional climate impact models. Since a lot of data is involved, researchers can target a search using filters. For example, they can search for data from a particular CMIP5 (Coupled Model Intercomparison Project Phase 5) experiment or specify the realm (such as 'atmosphere' or 'ocean') to which the data belongs to. The website also has options to visualise the models so that a researcher can get a quick grasp of the predictions provided.

Although still a prototype, there are a few organisations already making use of the climate4impact portal. The hydrological consultancy firm Deltares, for instance, uses climate impact scenarios for their models on sea level rise and flooding risks and use the climate4impact portal to extract data.

Easiness

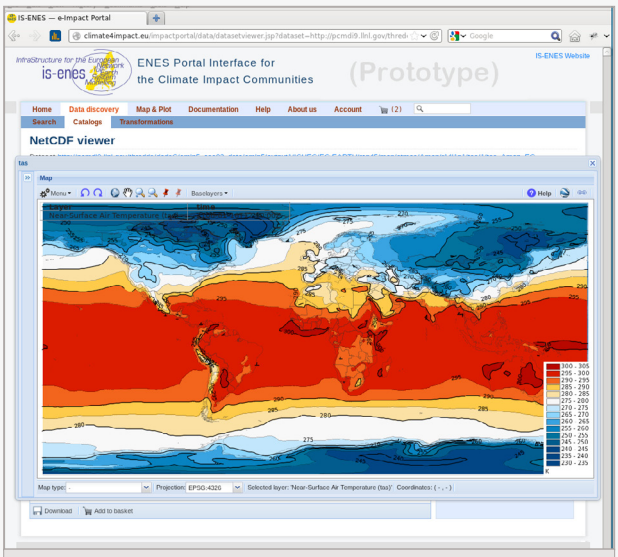
The website is the result of collaboration within the European FP-7 project Infrastructure for the European Network for Earth System Modelling or IS-ENES (pronounced 'easiness'). It is a joint effort of several ENES members, from research centres to meteorological institutes. They are: the European Centre for Research and Advanced Training in Scientific Computation in France, CNRS' Institute Pierre Simon Laplace, also in France, Italy's Euro-Mediterranean Center on Climate Change, Wageningen University in the Netherlands, the French National Centre for Meteorological Research, the Dutch Royal Netherlands Meteorological Institute (KNMI), the Romanian National Institute of Hydrology and Water Management and the Swedish Meteorological and Hydrological Institute.

Screenshot of the front page of the climate4impact website.

According to KNMI's Wim Som de Cerff, in charge of setting up climate4impact, there are virtually no GCM portals available that offer the same kind of overview as the ENES portal. "Other climate impact portals have a regional focus or are specialised for a certain type of research. The ENES portal has a much broader scope."

The ESGF, which – in addition to the data infrastructure – provides search services and security infrastructure for the website, also has its own gateway, but the climate4impact portal offers additional features that make it easier for users to handle the data. "We offer tools to visualise the data, documentation that gives researchers an idea of what they are looking at and make the downloading process as simple as possible."

One of the biggest advantages of the data portal is that researchers require less time to analyse data, allowing them to devote most of their attention to looking into multiple climate models. "A typical climate impact researcher spends most of their time collecting and converting data and making a cut out of an area he or she is interested in; there is simply no time for more than one or two model runs. As a result, a scientist would not necessarily choose the best model that is most suitable for their question." Som de Cerff emphasises that there can be significant differences between models and some models are more useful to predict certain phenomena than others. "That's something we really want to bring into perspective with the data portal."



The portal's visualisation of near surface air temperature from the EC-Earth global climate model

Next steps

Though the portal offers great possibilities to researchers, there is still room for improvement. One of the issues the team in charge of the project intends to solve is to make the search more specific so that it results in fewer records. "With a portal search, a user can bring the amount of data back from a million to 30,000 records," says climate4impact developer Maarten Plieger. "While that is a big step forward, a lot of researchers still can't work with that amount of data." Because of this, at present the portal is more useful for climate modellers than for researchers coming from other fields, though this is something the team wants to see changed in the near future.

The team also wants to imbed processing tools into the portal to allow users to extract an even smaller subset of data than at present. These new tools should also allow researchers to derive data from the values used in the models so that the extracted information better answers the specific questions they are looking into.

Another improvement is the enrichment of the data portal with regional climate data models from the CORDEX group. CORDEX (Coordinated Regional Climate Downscaling Experiment) is an initiative with a goal similar to ENES': exchanging and comparing climate impact models to pinpoint the main differences. "They're involved with a lot more institutions and are at the phase where they have to describe metadata in order to make the models comparable", says Som de Cerff. "By joining the ESGF infrastructure, we all can benefit from the lessons learned and their data will become available in the same way as the GCM data in our portal."

For more information on climate4impact, please contact Maarten Plieger (plieger@knmi.nl) or Wim Som de Cerff (sdecerff@knmi.nl).

Bram Semeijn
Semeijn Teksten (bram@semeijnteksten.nl),
for the climate4impact team

From the bottom up: helping geologists lead the way for global development

Jane Robb, Communications Officer for Geology for Global Development, writes about the organisation's goals and activities.

The natural hazards course I took as part of my geology degree at university was relatively comprehensive, or so I thought. We covered a diverse range of hazards which occur from Earth processes and climate, in a diverse range of countries, and we learnt about mitigation of these hazards including the pros and cons of each strategy. At the time, I was vaguely aware that geologists are employed by government or non-governmental organisations to help mitigate disaster events, to assess earthquake hazard potential and help those affected after the disaster has hit. It didn't occur to me that there was much more than this to the geologists' role in disaster risk prediction, mitigation and management. So when I heard about Geology for Global Development I was intrigued.

Geology for Global Development (GfGD) was set up in the UK as a direct response to this disconnect encountered by students of geology in university and the realities of geology's role in global development issues. Recognising the significant contribution good geoscience can make to international development and the fight against severe poverty, founding-director Joel Gill set up GfGD. His aim was to encourage and support young geoscientists in the growth of the skills and knowledge that they will need to make a positive, effective and greater contribution to international development throughout their careers.

One of the core concepts of the organisation is that geologists should be aware, from an early stage, of how they can help people and the environment. Crucially, scientists can do this through understanding and appreciating the social and cultural aspects of their roles and responsibility in sustainable and effective development, especially in the developing world.

Although Gill highlighted this issue back in 2011 with the start of GfGD, acknowledgement of the issue regarding the disconnect of geology and sociocultural issues is nothing new. Thankfully, UK universities can now be seen making changes to their geoscience curriculums to account for this. Keele University, the University of Edinburgh, Plymouth University and King's College London all offer

geoscience or geography courses that provide a focus on socio-economic systems, the environment, sustainable development and insights on human settlement, planning and policy in specific relation to the study of natural hazards.

It is with this in mind that GfGD aims to influence the future of young geoscientists tangentially, through offering short placements in collaboration with organisations such as CAFOD and Tearfund, to be undertaken during university. These placements establish opportunities to gain practical work experience in the development sector and (in the future) in developing countries. The volunteering opportunities allow young geoscientists to develop an understanding of issues such as development and community vulnerability, as well as inter-personal and communication skills, to promote both better cross-cultural and cross-disciplinary work.

At two years old, the UK-based non-profit organisation has over 150 members, predominantly based in student groups in universities across the UK including University College London, Imperial College, Leicester, Cambridge and Oxford. GfGD works with these student groups on the development of resources that explain aspects of geoscience in a simple, accessible manner for use by non-governmental organisations aimed at developing greater appreciation of how good geoscience can be integrated into development projects. Talks and social events are also arranged by the student groups independently. The aim is to outwork the core objectives of GfGD and alert young geoscientists to their role in global development with the help of expertise in the wider geoscience community. Currently, the university groups and placements are only available to UK students, but this is something Gill hopes to expand in coming years.

The fast growth of the organisation has led to the formation of its first national committee, made up of eight geoscience students or recent graduates – including the director Gill – passionate about the goals of GfGD. The organisation also has an advisory board made up of professional geoscientists with knowledge and experience from working in non-governmental organisations, consultancies, geological surveys and universities.

Appointment of the UK-wide committee has allowed GfGD to expand on its work across a range of fronts including its university groups, education and careers, publications, communications and advocacy. As communications officer for GfGD, I am proud to represent such an organisation and personally relate strongly to its objectives.

Geologists learn many of their technical skills in the field, such as these students mapping an active fault in Greece. GfGD recognises the importance of similar experiential learning opportunities for the wide range of inter-personal/communication skills required in development work. (Credit: Joel Gill)

An understanding of ground conditions helps this Tanzanian water technician make an informed choice about sites for protected water sources (e.g. pumps and wells). (Credit: Joel Gill)

Looking to the future, GfGD hopes to develop its own overseas placement scheme that will give students and recent graduates the opportunity to spend time working in less-developed countries. We would like these placements to involve close collaboration with those in host countries, including with local universities, government surveys or charitable organisations. This focus on strengthening local technical capacity can bring benefits to both the students and the hosts, while the opportunities for dialogue, skill sharing and knowledge exchange can help the mutual fostering of both soft and technical skills essential for successful and sustainable development projects.

Rather closer on the event horizon is our first National Conference that will be taking place on the 23rd October 2013 at the Geological Society of London, UK. This one-day event will bring together geology students and recent graduates with professionals from across the global development sector. The conference will explore if and how geologists can contribute to the fight against global poverty, providing a 'big picture' of the opportunities and careers available. Hearing from a range of specialists, the conference will explore the skills young geologists will need to develop to contribute to development in an effective and sustainable manner throughout their careers.

The call for papers and registration will be opening soon, and we would love it if you could join us.

Jane Robb
GfGD Communications Officer

More information

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