34. **CLIMATE SCOPE: using the Google Earth virtual globe for a visual storytelling of climate change**

**Valentina Grasso$$^1$$, Alfonso Crisci$$^2$$, Federica Zabini$$^1$$

$$^1$$CNR Institute of Biometeorology–LaMMA Consortium, Sesto Fiorentino, Italy
$$^2$$Institute of Biometeorology, Florence, Italy

v.grasso@ibimet.cnr.it; $$^2$$Institute of Biometeorology, Florence, Italy

In our contemporary ‘visual culture’ computer generated visualisations have great potential as a mean to engage people about environmental issues affecting society. Climate change (CC) being a challenging science communication topic the use of visualisation can bring much to lay people’s understanding of its signs and impacts.

The challenge of communicating climate change

For most people, CC is a “far away” problem, something that isn’t tangible and that does not relate to their own life. Compared to other environmental issues climate change has some specific features that make its communication challenging.

Climate is not such a simple concept to understand, people tend to confuse it with local weather, using their personal and limited experience to make general statements. Moser (2010) summarised some of the most evident traits that make climate change “a tough issue to engage with”. The first characteristic is that CC is not visible: anthropogenic drivers of climate change, normally indicated with the rise in greenhouse gases (GHG) concentration in the atmosphere, are not visible to human eyes, and do not produce any immediate physical evidence. A second reason is that climate change impacts are very often distant in space and time: even the rise of GHG emissions doesn’t seem to cause immediate and direct impacts, and those occurring are not spatially related to the source of carbon emissions.

Another lack of visibility is the fact that early signs of climate change are occurring in inhabited areas (Poles, coral reefs or mountains). So most evidence of actual CC remain “hidden” to people, that tend to disregard the issue in everyday decision-making compared to other more compelling needs and immediate demands. The invisibility is also enhanced by the urbanisation of global population that has diminished people’s attention and assertiveness in regard to natural processes thus reducing their perception of eventual climate shifts.

A last trait of CC is its great complexity in terms of the physical and ecological dynamics and the related uncertainty about future scenarios, due to the limits of the state-of-art of the scientific knowledge, has been used by lobbies to foster non-action. Media also contribute negatively by turning the scientific debate into a show where scientists are portrayed as “duelists”, the alarmists vs the sceptics, with the effect of capturing public attention but at the cost of reducing their confidence in scientific findings.

In this context it is important for communicators to give more concreteness and truthfulness to climate change facts, decoding science data in a way people can trust and understand. Pre-
vious research on this topic (Nicholson-Cole, 2005; Sheppard 2005) has shown that meaningful visualisations about CC could help to bridge the gap between what may seem an abstract concept and the real everyday experience, making clearer its local and individual relevance.

The RACES project and the Climate Scope

Communicating climate change was the main aim of the EU LIFE project RACES - Raising Awareness on Climate and Energy Savings. The project was directed to build an awareness-raising campaign to communicate climate change and its impacts in five Italian cities (Trento, Modena, Firenze, Potenza and Bari), underlying local impacts and mitigation strategies.

In this framework, a Google Earth engine tool based on Thematic Mapping API® library, named Climate Scope, was developed for educational and communication purposes. The goal of the idea is to have a powerful geographic viewer to show the physical dimension of current climate changes at the global and the local level, and at same time a tool capable of engaging users in becoming information producers about social dimension of changes through personal content sharing.

Climate Scope features

Climate Scope is a mash-up merging climatic and environmental global geographic layers (scientific level) available on the web with geo-located user generated content (media and social level). On this basis Climate Scope was proposed to teachers of secondary schools (14-19 year-old students) involved in the RACES project to be used as an educational tool to frame CC as a global and real event taking place nearby. During the project the Climate Scope was arranged with a pre-set of layers considered useful and comprehensive to start exploring CC. Nevertheless the tool can be further customised by any user to show the relevant information to be highlighted.

The information displayed inside the Google Earth project mash-up were twofold: a set of global climate-related layers, showing data-derived maps downloadable from the internet, like Land Surface Temperature Anomaly (NEO-NASA), Vegetation index (MODIS NDVI), European Drought Severity index (ESA); and a set of real-time layers displaying quasi real-time information as Global Cloud Coverage (provided by Xplanet), Sea Surface Temperature Anomaly (CoralReefWatch-NOAA), real time Precipitation Estimate (EumetSat). These sets of layers produced by authoritative agencies and scientific institutions were then integrated with local information formatted as geo-located signposts inside the Google Earth viewer. Depending on the purpose, different kinds of information were added:

- Scientific local data, as for instance historic series of a physical parameter represented by the map layer (i.e. global/local temperature’s anomaly);
- Media produced content, like news or video to include information on social impacts of climate change, such as economic loss due to a strong heat-wave.
- Institutional content, showing mitigation/adaptation efforts by local governments to foster people participation at local level;
- Lay people content, like observations of local changing climate (picture or info) or personal stories about community resilience practices and consumptions choices.
Presenting local stories within a geographic environment of global information layers can help individuals to bridge the gap experienced in relating their personal actions to the global context. (Nicholson-Cole 2005; Sheppard 2005)

Climate Scope was conceived to enhance visual communication and to propose a participatory approach using the geo-environment as the cognitive frame to communicate climate change. The visualised mapping of scientific information and beautiful satellite images were used to explain different signals and impacts through colour scales. Visual representations make data more attractive (see Fig. 1 and 2), illustrate the global dimension of changes and finally can engage the public emotionally.

Climate Scope might also be used to foster public participation in science at different levels. Users are invited to become “observer, researcher and producer” of local information, integrating climatic and social data and publishing it. An opportunity to strengthen the collaboration between researchers and lay people or students, new actors of “volunteered geographic information” (Goodchild 2007), an assertive method of collecting geospatial information as opposed to the authoritative method that government agencies employ to collect data. In the new framework of Web 2.0, users may contribute to science generating meaningful contents; citizens become local “sensors” who have the chance to verify eventually the scientific and authoritative sources, adding new information and contributing to keep it up-to-date, realizing sometimes valuable examples of collective intelligence.

Fig. 1: The Cold Wave of February 2012 as showed in the Climate Scope Layer of Land Surface Temperature Anomaly (NEO-NASA)
**Fig. 2: Red Spot showing El Nino in the Climate Scope - SST Anomaly layer**

*(CoralReefWatch_NOAA)*

**Conclusions**

Far from being a definitive tool, Climate Scope is a proposal for framing the climate change issue in a way to be effective: where the distant problem can be brought closer, the invisible can became visible; and solutions happen to be true and feasible because they are shared through real personal stories. Overcoming the “deficit model” (considering general public as lacking in science information), Climate Scope aims at being an example of “citizen science”, where lay people knowledge might integrate and give meaning to experts and authoritative knowledge. Further work should be done to evaluate the real feedback from people using Climate Scope as an effective tool to understand and engage with climate change.

**References**


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