A Preliminary Evaluation of the Latin American Observatory's Climate Services

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Abstract

The Latin American Observatory, or OLE^2 (Muñoz et al., 2010), is an informal regional partnership started in 2008 with the aim of enhancing the collaboration between national weather services (NWS) and research and development institutes in Latin America. OLE^2 provides scientific support, training, and additional (weather and) climate services to partner organizations in order to increase the local and regional efficiencies of environmental decision-making, especially in terms of risk management strategies and the establishment of early warning systems (García-Solera, 2012; Muñoz et al., 2012). Although regarded as a successful partnership, until now no formal evaluation has been performed on the Latin American Observatory as a network to enhance the provision of climate services (García-Solera, 2012). In this work the evaluation elements suggested by Vaughan & Dessai (2014) are used to diagnose the use of OLE^2 products by its partners, the network structure and governance, communication methods, and the efficacy of its technology and knowledge transference. This study uses 28 online semi-structured surveys (a total of 14 countries participate in the partnership) and a case-by-case analysis of OLE^2's climate services reported in the literature. In the following pages the conclusions of this study are summarized.

Structure, Governance and Decision-Making Context

The structure of the Observatory is found to be very flexible, permitting the free interaction of its members through different ways, sharing data, methodologies, tools and experiences (but hitherto no funding). Surprisingly enough, the OLE^2 has continued its operations without having ever received any funding as a regional initiative: partners receiving funding for particular projects in their countries voluntarily share products or results that are deemed useful for other partners in the network, but in general the operative products (the most concrete example is the set of multi-member seasonal-scale

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model outputs from a general circulation model executed monthly by a few partners and then publicly shared) are not funded by any external source; it is suggested that this is due to a continuous inter-dependence and co-production of services by the different partners, and that it is a stable configuration as far as there is some form of reciprocity in the partnership; there are institutions, however, that tend to take advantage of other's products and experiences, but this behavior tends also to isolate them, thus self-regulating the system. An obvious drawback in this structure is that in general new methodologies and services are not automatically implemented by all the partners, since there is not money to guarantee the fast acquisition of, for example, computational infrastructure, instrumentation or human resources for such a wide spread improvement; the way of the OLE^2 seems to be one of slow but stable evolution: once new tools and methodologies are made available to the partners, the associated climate services will appear once the institutional conditions permit so, and that usually takes time in Latin America. Naturally, this generates asymmetries in the partnership, but in some cases the same asymmetries also impulse the local availability of the required resources (e.g., through "healthy" competition between countries/institutions). Sometimes that is not the case, and a regional funding could help, among others, to decrease the asymmetries between the partners.

A very important issue found in this work is that interactions in the partnership mainly occur among the forecasters or climate information providers (focal points) in the different institutes, and not among the directors or high-level decision-makers of those institutes. This is absolutely normal, as the most frequent interaction in the Observatory is a technical and not a political one, but this scheme is often counterproductive as several directors tend to unknown the full details and extent of the collaborations. Since the creation of the Observatory there have been no meetings between the high-level decision-makers of each institute in reference to which could be the common set of policies that the partnership should implement to address the common need of climate services. It is absolutely necessary to change this, and since some of the original focal points have been promoted in recent years and are now directors themselves or closer to the institute's person-in-charge, it may be possible to improve this high-level communication. Moreover, the OLE^2's secretariat –held since the origin of the partnership by the Centro de Modelado Científico (CMC) in Venezuela- plays more the role of a scientific coördinator than a logistic and political one. Indeed it is important to have a regional scientific coördinator and certainly several advances have been made on the research, training and development side (the actual core of the partnership), but it is extremely necessary to balance that coördination with a similarly creative political one, either at the same institute or at another. The lack of funding as a regional initiative could well be related to the absence of a regional political leadership with support of the World Meteorological Organization (WMO) country representatives, but also to the fact that Venezuela's relationships with key international aid agencies and certain countries is not facilitating the access to external economic resources. Changes in this structure are

necessary in order to strengthen the Observatory.

Problem Identification, Characteristics and Tailoring of Services

In terms of the services itself, although the problems addressed by the partnership are in general clearly identified by the members -another of Vaughan & Dessai (2014) elements for evaluation-, sometimes services are not necessarily defined in terms of the actual end-user's requirements, but in terms of other institutional commitments and availability of funding frequently provided by international donors with specific agendas; for example, several institutes tend to ask for support about generation and analysis of hi-resolution long-term climate change scenarios. Nonetheless, most part of the work done by the Observatory is at seasonal scale (e.g., forecasts, early warning systems), which is widely considered by most of its members as the most important time scale in terms of establishment of climate-smart policies by their country decision-makers. The relative importance of the time-scale is slightly different in different countries or institutes (Muñoz *et al.*, 2012), but in general the seasonal scale is followed in importance by scales related to nowcasting, weather (typically up to 72 hours), historical (20-60 years in the past, typically associated to detection of trends in standard climate indices), near-term climate change (next 20-30 years, in exploration only by a few partners) and end-of-the-century climate change. NWS are becoming now more interested in the sub-seasonal scale (14-60 days), and accordingly a couple of projects have just started in Ecuador, Colombia and Venezuela under the coördination of CMC. All in all, though the present activities of the Observatory are primarily focused on the seasonal scales, it is important that more partners could start experiences at sub-seasonal and also at decadal scale in the near future.

As mentioned earlier, the most important regional climate services provided by OLE^2 are seasonal forecasts, especially rainfall and temperature anomalies, following the multi-tier methodology described by Muñoz *et al.* (2010). The skill of OLE^2 seasonal forecasts have been already discussed in the literature (e.g., Muñoz *et al.*, 2010; Recalde-Coronel *et al.*, 2014; Muñoz *et al.*, submitted; Bravo-de-Guenni *et al.*, submitted), finding that there is enough potential predictability in multiple regions as to implement early warning systems and risk management strategies a few months in advance for different sectors, namely disasters, food security, water resources, urban planning, and health (see García-Solera & Ramírez, 2012; García-Solera, 2012; Muñoz *et al.*, 2012; Recalde-Coronel *et al.*, 2014; Stewart Ibarra *et al.*, 2013; Stewart-Ibarra & Lowe, 2013, Hidalgo *et al.*, in press).

Except for the seasonal rainfall and temperature anomaly forecasts, which are of a more general nature, all the different climate services provided by the Observatory are tailored to the user needs (~75% are NWS), and most of them are directly designed with the close participation of those same users. Concrete examples are reported in the related

literature (García-Solera & Ramírez, 2012; Ingrid García-Solera, 2012; Muñoz *et al.*, 2012; Recalde-Coronel *et al.*, 2014; Stewart Ibarra *et al.*, 2013; Stewart-Ibarra & Lowe, 2013). The Observatory employs multiple ways to tailor the products, but the process usually involves the identification of thresholds defining categories of interest for the users in a wide range of sectors (as mentioned earlier, from disaster to health), and then the use of those thresholds to provide concrete answers for decision-makers.

Communication, and Technology-Knowledge Transfer

The Latin American Observatory is an especial climate service provider in several senses, but in particular because it is specifically aimed at providing services to its own partners and not necessarily the general public. The OLE^2 is thus a boundary institution that links providers (e.g., universities and research & development institutes) and "middle"-users (e.g., NWS, ministries, development projects), offering final or intermediate climate services that are communicated to the end-user (i.e., general public) by the relevant institutions in opportune time. This has an additional advantage: the middle-users, especially the NWS, do not feel themselves "displaced" by the Observatory, but strengthened. In addition, this approach respects the fact that in several countries (e,g., Venezuela) the only institution legally capable of communicating weather and climate services for governmental decision-makers is the NWS, thus avoiding possible legal complications and responsibilities.

The Observatory, as reported by Muñoz *et al.* (2010; 2012), mainly uses an email list, a wiki, and FTP service and videoconferences to make the services available to its members and to discuss them. The strengths, weaknesses and uncertainties are analyzed and then the partner is in charge of tailoring and communicating the services using its own standards and channels.

A very important characteristic in the approach followed by the partnership is the inclusion in their products of measures of the associated uncertainties. The preferred way to report uncertainties in the OLE^2 is the use of probabilities associated with the occurrence of a particular event, or to mask in spatial maps regions with high uncertainty. Due to the way the partnership works, the middle-users do not have problems understanding this, and use their own ways to explain this information to the end-users.

The analysis of the surveys indicates that the most important contribution of the Latin American Observatory is the transference of knowledge and technology (not computers or instrumentation, but tools and procedures). This is actually the main goal of the partnership. This transference is normally done by virtual interactions using videoconference tools, the email list and especially the wiki, but also through local

trainings although those are not as frequent due to the implied cost. The surveys also indicate that the OLE^2's wiki plays an extremely important role in terms of knowledge transference: everything new that the Observatory generates is made freely available not only to the partners but also to the general public, and it is maintained not only by CMC personnel, but also by others partners. The analysis reveals that the content of the wiki is also not only relevant for the OLE^2 community, but also to institutes, communities and individuals in other countries, especially in Spain, Portugal, Italy, and France (although the language of the wiki is Spanish). In the OLE^2, one of the countries with the highest visits of the wiki is Peru, even though is not one of the most participative partners.

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