Open Skies, Open Data – A Strategic Commitment from Chile

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Editorial

Over the past decade, Chile has established itself as a key global contributor to astronomical data production. With more than 70% of the world's ground-based observational capacity located in its territory, the country offers not only exceptional skies, but also a data volume comparable to that of major scientific infrastructures (de Economía, 2012). Until recently, most of these data were managed abroad, resulting in the outsourcing of much of the technological and scientific value they generate. However, a different perspective has emerged in recent years: data are now recognized as a strategic asset, capable of strengthening national capacities in data science, engineering, and artificial intelligence.

This shift was made concrete with the establishment of the Chilean Virtual Observatory (ChiVO) in 2014, which adopted the interoperability standards defined by the International Virtual Observatory Alliance (IVOA). For the first time, this platform enabled researchers in Chile to directly access and process large volumes of data from facilities such as ALMA, using local infrastructure and international collaboration (Solar & Araya, 2015). ChiVO fostered a technical and scientific community around astroinformatics, supported by open data and interoperable architectures. The fact that this infrastructure was developed following open science principles positioned it as an example of how frontier research and national technological capabilities can be aligned.

Chile's ALeRCE project further illustrates this trend. Since 2019, it has processed over 97 million ZTF alerts and classified around 19 million astronomical objects using machine learning models developed domestically (Förster et al., 2020). This case shows that access to public datasets enables the development of advanced analytical tools. In turn, these tools generate transferable knowledge with applications beyond astronomy, including artificial intelligence,

large-scale data processing, and distributed computing. Recent estimates suggest that over 30% of ALMA archive-based publications are produced solely using publicly available data (Massardi, 2023).

A recent example of technology transfer is the control software for the *European Solar Telescope (EST)*, developed by engineers at the Advanced Center for Electrical and Electronic Engineering (AC3E) of the Universidad Técnica Federico Santa María. This telescope, currently under construction in La Palma (Spain), aims to become the most advanced solar observatory in the visible and near-infrared spectrum. The software, built upon distributed architectures and interoperability principles similar to those adopted by ChiVO, supports the idea that local expertise around open data can scale into exportable solutions with real-world impact (Universidad Técnica Federico Santa María, 2024).

Chile's experience suggests that managing scientific data under open-access principles can promote technological sovereignty and digital development. The decision to store, analyze, and reuse astronomical data locally has helped to consolidate national capacities in science, engineering, and innovation. Beyond the telescopes themselves, open data have enabled Chile to position itself as a relevant node in the global architecture of open science, **contributing to the consolidation of critical data infrastructures that support collaborative, reproducible, and locally meaningful research**.

Author Contributions (CRediT)

Humberto Farías: Conceptualization; Writing – Original Draft Preparation.
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Bibliografía

de Economía, M. (2012). Capacidades y oportunidades derivadas de la astronomía en chile [Informe final]. https://www.economia.gob.cl/wp-content/uploads/2012/06/OPORTUNIDADES-ASTRONOMIA-EN-CHILE-INFORME-FINAL.pdf

Förster, F., Cabrera-Vives, G., Castillo-Navarrete, E., Estévez, P. A., Sánchez-Sáez, P., Arredondo, J., & Vergara, J. R. (2020). The automatic learning for the rapid classification of events (alerce) alert broker. *arXiv preprint*. https://arxiv.org/abs/2008.03303

Massardi, M. (2023). The ari-l project and the alma science archive development. https://indico.ict.inaf.it/event/2304/contributions/15020/attachments/7070/14389/Massardi_Ari-l_mmws.pdf

Solar, M., & Araya, C. (2015). Open skies with cloud computing. In E. Tambouris et al. (Eds.), *Electronic government and electronic participation* (pp. 132–139). IOS Press. https://doi.org/10.3233/978-1-61499-570-8-132

Universidad Técnica Federico Santa María. (2024). Ingenieros usm realizan exitosas pruebas de software que operará observatorio en españa. https://usm.cl/noticias/ingenieros-usm-realizan-exitosas-pruebas-de-software-que-operara-observatorio-en-espana/