The Generic Mapping Tools and Community-Maintained Open Source Software

Paul Wessel

University of Hawaii at Manoa, SOEST, Earth Sciences, Honolulu, United States of America (pwessel@hawaii.edu)

The Generic Mapping Tools (GMT; www.generic-mapping-tools.org) is a well-known set of software for the geosciences, in particular in the marine and solid earth disciplines. GMT is used by many other well-known software infrastructures, including USGS's ShakeMap for near-real-time maps of ground motion and shaking intensity following significant earthquakes, MBARI/LDEO's MB-System for multibeam processing and mapping of the seafloor, and Scripps Institution of Oceanography's GMTSAR for radar interferometric analysis and imaging of crustal deformation. Today, GMT has tens of thousands of users all over the world and remains essential for many terrestrial and planetary data processing and map-making workflows. GMT began its life over 30 years ago when I was a graduate student, and it has enjoyed continuous US National Science Foundation funding since 1993. Leveraging this funding, GMT has succeeded in establishing itself as a collaborative Open Source community resource from the start. Many scientists globally, particularly European scientists, have been instrumental in designing, maintaining, and improving GMT since the early 2000s. As I and several of our core developers approach the end of our academic careers, the GMT team has been pondering how to preserve these collective investments and position GMT to remain an essential geoinformatics infrastructure well into the future. In response, we have made fundamental changes to how GMT works, enabling access to GMT modules from external interfaces such as MATLAB, Python, and Julia, simplifying user access to large global DEM datasets, and extending our support for the Google Earth platform. However, the biggest impact delivered by the Fall 2019 release of GMT 6 will likely be "modern mode". Modern mode coexists with classic mode (the only previous mode) so that thousands of GMT 4 and 5 scripts will still run as expected. Furthermore, new users will start with modern mode and experience a much-simplified GMT scripting syntax. A new aspect of GMT made possible by modern mode is a greatly simplified animation production. It is clear to all scientists that animations make it easier to elucidate temporal changes, yet very few scientists create animations as they are traditionally difficult to design. The GMT team aspires to make animations a task every scientist can do with ease. In this lecture, I will discuss the latest news on GMT, outline modern mode and the external environment access to our modules, highlight a few simple GMT animations, and present other aspects of our succession planning for strengthening the GMT community.