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Outlets for Distributing Geologic Maps in the Digital Age – Journal of Maps and Examples from the U.S. Geological Survey

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There are many ways to distribute geologic maps, from traditional paper products to digital maps in various formats, such as, Portable Document Format (PDF), Hyper Text Markup Language (HTML), or in a geographic information system (GIS). Examples of outlets for distributing digital maps include the international Journal of Maps (JoM) (PDF and HTML) and the U.S. Geological Survey's (USGS) Publications Warehouse (GIS and PDF). Geologic maps are used in various aspects of applied science and engineering, as well as research products that help unravel the geologic history of the Earth.

The Journal of Maps (<http://www.tandfonline.com/loi/tjom20>) is a multidisciplinary, international peer reviewed journal published by Taylor & Francis Online that provides a journal-style outlet for geologic maps and the science contained within them. Although JoM publishes all types of maps, it fills a niche for release of geologic maps that are often published only by geological surveys and specific organizations. JoM provides the opportunity for geologists to present not only their map, but also the data behind that map as well as its interpretation. The journal concentrates on maps that provide new data or add significant value to existing data and adheres to a high cartographic standard. Since it was founded in 2004, JoM has published 11 issues, 487 articles across 5299 pages, which includes 96 geological maps. Its success can be measured by the fact that the Impact Factor increased from 0.895 in 2014 to 1.193 in 2015.

Another example of geologic map distribution, is the USGS, which has been producing geologic maps since its inception in 1879. As technology has changed, so too have the mechanisms for distribution of geologic maps; occurring mainly over the last several decades as a transition from a purely paper product to a geodatabase structure in GIS. The USGS Publications Warehouse (<https://pubs.er.usgs.gov>) distributes a printable GeoPDF format map and includes links to the supporting GIS data. Most of the geologic maps produced in the United States are supported by the National Cooperative Geologic Mapping Program, mandated by the 1992 U.S. National Geologic Mapping Act. The act includes the development of a National Geologic Map Database (NGMDB) that links all of the geologic mapping from the USGS, state geological surveys, and academia and directs the user to the proper distributing entity for the maps. Also, the NGMDB is responsible for developing digital standards and data schema.

An important aspect map users need to consider is that the digital world has changed the way we think of scale. It is important to have the opportunity to view a map at the scale it is intended as the paper product. However, scale also addresses the resolution at which the geologic mapping was undertaken and how it should be appropriately used.

Geologic maps are robust products for providing information for real world applications. Geologic maps in a GIS can be layered with other types of data to answer questions related to resources, hazards, environment, land-use planning, and engineering. For Archiving and ease of viewing, PDFs are

commonly used for distribution. They have the added benefit of supporting coordinate systems, layering, raw data audio and video. There is important science that goes into producing a geologic map that needs to be communicated to the Earth science community. JoM provides an avenue to distribute the maps as well as the data and various geologic interpretations resulting from the geologic mappers' research in a peer-review forum that is valuable to the institutions, researchers and users.

