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Optimized global map projections for specific applications: the triptychial projection and the Spilhaus projection

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There is no perfect global map projection. A projection may be area preserving or conformal (shape preserving on small scales) in some regions, but it will inevitably exhibit considerable distortions in others. An oblique version of a projection (where the globe is rotated before projecting) can be optimized to avoid major distortions in specific regions of interest.
We present two global map projections of the Earth which either display all continents (including Antarctica) or the complete world ocean with minimal distortion and without any intersection. These are the triptychial projection and the Spilhaus projection, respectively.
The triptychial projection is original work and has been published by Grieger (2019). While that paper comprises complete information on the definition of the projection, the details of its application need to be collected from literature referenced therein. The triptychial projection is an oblique and rearranged version of the Peirce quincuncial projection of the world (Peirce, 1879).
Instances of the Spilhaus projection went viral on the internet in fall 2018. The projection is mostly attributed to a publication from 1942, but in fact it seems to appear for the first time in Spilhaus (1979). The projection is shown in that paper (and in a few later ones), but no information on its definition is provided. Developers of ArcGIS did some reverse engineering and could identify the Spilhaus projection as an oblique version of the Adams projection of the world in a square II (Adams, 1929).
The triptychial and the Spilhaus projection both imply several steps in their application. While the two projections look very different, they have one step in common: the conformal mapping of a hemisphere onto a square, which requires tabulated Jacobi elliptic functions. We review both projections, describe them in full detail, and provide all formulas and data needed to apply them. The algorithms employed may also be interesting for planetary applications.