Paper Number: 549

The structural mapping of an ocean – data and information

Miles, P.R.

Commission for the Geological Map of the World, CGMW (CCGM) 75005 Paris, France. Email ccgm@sfr.fr

---

The structural mapping of an ocean differs from normal geological maps in that the seabed geology cannot be mapped conventionally, otherwise it would represent mainly recent sediments. There is also the need to represent several geophysical parameters in addition to the observed and interpreted features of structural significance. The CGMW (CCGM) has been publishing these maps for some time with the style and detail continuously evolving.

The compilation must provide an accurate and readable explanation of the evolution of the various ocean basins by overlaying different entities of information in such a way as not to impede an acceptable balance between clarity and detail. This is achieved by the processing, interpretation and overlay of continuously evolving, but disparate, geo-referenced gridded and vector datasets. Principle controls here are gravity and bathymetric grids. The derived structural elements can then be cross-referenced with published maps and regional interpretations in the literature to integrate the various structural and geophysical parameters. These include magnetic anomalies (both as picks and interpreted isochrons), sediment thickness (shaded contours) and geological features relevant to structure including ocean crust age. Reference points for deep sea drilling sites, extinct spreading axes and major faults are included. Other three dimensional elements, such as seismicity and the Benioff Zones require special representation to convey deeper structure. An accompanying explanatory booklet describes the regional geology and tectonic plate development with a full reference to data sets and publications.

Today the CGMW publishes these maps in both printed and digital format enabling users to extract the elements for import and update into their own compilations. The maps are also designed to be relevant to both the scientific and the wider community with a varied target readership ranging from project planners to students and non-scientists for general interest. This requires the visualization of the geo-elements in a manner that clearly illustrates the structure and development of ocean basin formation by defining plate boundaries, subduction fronts and the formation of the continental margins – although the legal extended continental shelf is not included. The complexity of defining the continent–ocean boundary precludes this from being shown explicitly as it is often obscured by other cartographic features.

The CGMW has published a 1:50M structural map of the world and currently three structural maps at 1:20M have been published for the Atlantic and Indian oceans and for the western Pacific region.

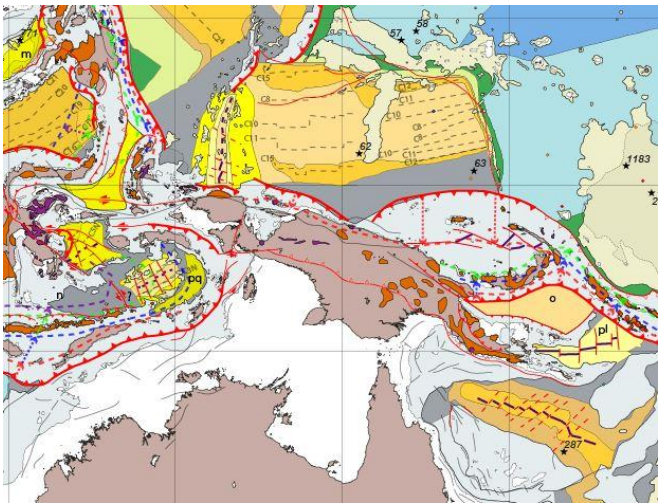

Figure 1: Extract from 'Structural map of the western Pacific'.