

Three-dimensional structure of the southwest Taiwan fold-and-thrust belt on the outer shelf and slope of the Eurasian margin

Joaquina Alvarez-Marron (1), Cristina Biete (1), Dennis Brown (1), and Hao Kuo-Chen (2)

(1) Institute of Earth Sciences, Jaume Almera, ICTJA-CSIC, 08028 Barcelona, Spain. (jalvarez@ictja.csic.es), (2) Department of Earth Science, National Central University, Zhongli District, Taoyuan City, Taiwan

The southwest Taiwan fold-and-thrust belt is forming on the outer shelf and slope of the Eurasian continental margin. It comprises a roughly N-S striking, west-verging imbricate thrust system that has been developing since the Late Miocene. Here, we present the results of new surface geological mapping from which we construct balanced and restored cross sections and along-strike sections. From these we compile maps of the basal thrust, thrust branch lines and, where possible, stratigraphic cut-offs. To interpret the structure in the subsurface and beneath the basal thrust, we use a P-wave velocity of 5.2 km/s as a proxy for the top of the Mesozoic basement. From these data we interpret the 3D structure of the fold-and-thrust belt and the influence that the structure and morphology of the continental margin is having on its development. We divide the southwest Taiwan fold-and-thrust belt into a number of thrust sheets that form the basis of our description and interpretations. Shortening is variable, ranging from 16 km to 25 km. We show that there are significant along-strike changes in the structure that we suggest have a causal relationship with variations in the geometry of the basal thrust and that these, in turn, are related to basement highs and lows interpreted from the P-wave velocity model. Finally, a number of local- and regional-scale unconformities provide information on the Pliocene through Holocene growth of the fold-and-thrust belt and the change from marine to sub-aerial deformation.

This research is supported by the project PROTAI-2 (CGL2013-43877-P).