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3D visualisation of geological structures: dismantling a threshold concept in structural geology

Eddie Dempsey
Dept. of Earth Sciences, Durham University, Durham, UK (e.d.dempsey@durham.ac.uk)

Structural geology is always challenging to students as it requires them to carry out complex 3D visualisations and manipulations. Since the pioneering work of William Smith in 1815 and the publication of his map of the geological strata of England and Wales, geological maps and cross sections have been the cornerstone of data recording and dissemination in geoscience. Geological maps and sections are a representation of the 3D geological world in an easy to replicate 2D format. However, when presented in this format, the observer is expected to understand this 2D data set in 3D space. For people who have been immersed in geoscience for several years this skill is second nature, but to those new to the science, it can prove to be a significant threshold concept. GEOL1051 – Field Studies is a first year module delivered by the Department of Earth Sciences, Durham University. A major component of this module is the creation and interpretation of geological structures though geological maps. Traditionally students taking this module are presented with geological maps and then led through the interpretation of those data sets. These students regularly express significant concerns about these skills due to their own perceived lack of 3D spatial awareness. To counteract these issues our method of teaching geological structures on maps has been inverted with students now exposed to 3D visualisation before geological maps are encountered/interpreted. Students are introduced to 3D geological structures though digital animations, constructed models and analogue experiments. This pico session will discuss the positive affect this restructuring has had on students' abilities, perceptions and enjoyment.