Geophysical Research Abstracts
Vol. 16, EGU2014-14087-1, 2014
EGU General Assembly 2014

Initial phases for the development of a Structural Geology database

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We are at the beginning stages of developing a Data System for Structural Geology and Tectonics (SG&T). This activity is prompted by the necessity of reporting our data from government-funded projects and the lack of any existing database. SG&T data is complex for a variety of reasons, including the wide range of temporal and spatial scales (many orders of magnitude each), the complex three-dimensional geometry of some geological structures, inherent spatial nature of the data, and the difficulty of making temporal inferences from spatial observations. To successful implement the step of developing a SG&T data system, we must simultaneously solve three problems: 1) How to digitize SG&T data; 2) How to design a software system that is applicable; and 3) How to construct a very flexible user interface.

To address the first problem, we introduce the "Spot" concept, which allows tracking of hierarchical and spatial relations between structures at all scales, and will link map scale, mesoscale, and laboratory scale data. A Spot, in this sense, is analogous to the beam size of analytical equipment used for in situ analysis of rocks; it is the size over which a measurement or quantity is applicable. A Spot can be a single measurement, an aggregation of individual measurements, or even establish relationships between numerous other Spots. We propose to implement both a Spot and a more traditional Mapping mode for data input.

The final challenge is to construct a user interface that is intuitive, open source, and spans as many operating systems and devices as possible. For these reasons, we propose to develop a web-application that can run in both a connected (on the internet) and disconnected mode. Our hope is to have extensive and international community input into the data system development process.