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Seismic data clustering management system

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Over the last years, seismic images have increasingly played a vital role to the study of earthquakes. The large volume of seismic data that has been accumulated has created the need to develop sophisticated systems to manage this kind of data. Seismic interpretation can play a much more active role in the evaluation of large volumes of data by providing at an early stage vital information relating to the framework of potential producing levels. [1] This work presents a novel method to manage and analyse seismic data. The data is initially turned into clustering maps using clustering techniques [2] [3] [4] [5] [6], in order to be analysed on the platform. These clustering maps can then be analysed with the friendly-user interface of Seismic 1 which is based on .Net framework architecture [7]. This feature permits the porting of the application in any Windows – based computer as also to many other Linux based environments, using the Mono project functionality [8], so it can run an application using the No-Touch Deployment [7]. The platform supports two ways of processing seismic data. Firstly, a fast multifunctional version of the classical region-growing segmentation algorithm [9], [10] is applied to various areas of interest permitting their precise definition and labelling. Moreover, this algorithm is assigned to automatically allocate new earthquakes to a particular cluster based upon the magnitude of the centre of gravity of the existing clusters; or create a new cluster if all centers of gravity are above a predefined by the user upper threshold point. Secondly, a visual technique is used to record the behaviour of a cluster of earthquakes in a designated area. In this way, the system functions as a dynamic temporal simulator which depicts sequences of earthquakes on a map [11].

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