

# Time Residual Analysis of The Catalan seismic network broadband stations in relation to local geology

## Abstract.

We have analyzed the mean value of P-wave and S-wave time residuals for 20 broadband seismic stations of Catalonia at regional distances. We studied a five-year period record of local events obtained by the Cartographic and Geologic Institute of Catalonia (ICGC). The criteria used for the data selection were that magnitude is above or equal to 1. Epicentral distances for all stations are shorter than 300 km. Within this window, a total of 1140 earthquakes were selected from the database. The station CORI was chosen as reference station because of its centered location with respect to all other stations and its high number of phase readings. Relative time residuals were calculated by subtracting the average of CORI time residuals. In relation to station CORI, our results show very small residuals, with the average of P wave time residual between -0.0357 s and 0.5751 s, and for S wave from -0.1016 to 0.1529 s. For most stations, the residuals relative to CORI are positive, which means that the structure's actual velocity is lower than the one assumed by the model. There are some cyclic variations of the time residuals at several stations. Generally, positive residuals come from events originated at the North North-West. A rough correlation has been made between the Bouguer Anomaly and the results of the time residuals.

**Valeria Lorenzoni**

**Tutors : Tànit Frontera, Josep Batlló and Pilar Queralt**

