Earthquake precise locations catalog for the Lesser Antilles subduction zone (1972-2013)

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Locations for earthquake recorded in the Lesser Antilles subduction zone are processed separately by regional observatories, NEIC and ISC. There is no earthquake location catalog available compiling all available phase arrival data. We propose a new best complete earthquake catalog by merging all available phase arrival data for better constrains on earthquake locations. ISC provides the phase arrival data of 29243 earthquakes (magnitude range from 1.4 to 6.4) recorded by PRSN (Porto Rico), SRC (British West Indies), and from FUNVISIS (Venezuela). We add phases data from IPGP observatories for 68718 earthquakes from magnitudes 0.1 to 7.5 (OVSG, Guadeloupe, recorded 53226 earthquakes since 1981, and OVSM, Martinique, recorded 29931 earthquakes since 1972). IPGP also provides the accelerometer waveform data of the GIS-RAP network. We achieved automatic picking on the GIS-RAP data using the Component Energy Correlation Method. The CECM provides high precision phase detection, a realistic estimation of picking error and realistic weights that can be used with manual pick weights. The CECM add an average of 3 P-waves and 2 S-waves arrivals to 3846 earthquakes recorded by the GIS-RAP network since 2002. The final catalog contains 84979 earthquakes between 1972 and 2013, 24528 of which we compiled additional data. We achieve earthquake location using NonLinLoc, regional P and S waves data and a set of one dimensional velocity models. We produce improved locations for 22974 earthquakes (better residuals, on equal or larger arrival dataset) and improved duration magnitudes for 6258 earthquakes (using duration data and improved locations). A subset of best constrained 15626 hypocenters (with more than 8 phases and an average RMS of 0.48 ± 0.77s) could be used for structural analysis and earthquake local tomography. Relative locations are to be applied in order to image active faulting. We aim to understand coupling in the seismogenic zone as well as triggering mechanisms of intermediate depth seismicity like fluid migration beneath the volcanic arc.