



UWI

Seismic Research Centre



Seismicity of Trinidad and Tobago

Overview

Trinidad and Tobago lies within a plate boundary zone near the south-eastern margin of the Caribbean Plate. The Caribbean plate is bounded on its eastern margin by a portion of the North American (NA) Plate. At about 200 kilometres east of the chain of volcanic islands in the eastern Caribbean the NA Plate is being subducted beneath the Caribbean plate. Along the northern and southern boundaries the Caribbean plate slides past the NA and South American Plates in an easterly direction at a rate of about 2 cm/year (3/4 inch/year). Rather than moving continuously, the plates tend to become locked along planar fault segments, accumulate strain then rupture in zones.

In the case of Trinidad and Tobago these zones include: (1) the Paria Peninsula Zone, (2) the Gulf of Paria Zone, (3) S.E. of Trinidad Zone and (4) the S.W. of Tobago Zone. (See Fig. 1). Plate tectonic theory therefore allows scientists to say: **where earthquakes have occurred in the past, earthquakes will occur in the future!**

Historically damaging Earthquakes in Trinidad and Tobago		
Year	Magnitude (M_w)	Damage Sustained
1766	7.8	Destroyed then capital city (St. Joseph).
1825	6.6	Much damage in Port-of-Spain.
1888	7	Several buildings and structures damaged.
1918	7.3	Damage to most masonry buildings in Port-of-Spain.
1954	6.3	Several injured. One fatality. Many buildings damaged.
1968	6.5	Severe damage in N.W. Trinidad. Two killed in Venezuela.
1983	5.9	Several injured at Queens Park Oval.
1997	6.7	Over TT\$18M estimated in damage in Tobago.

Fig. 2 – Table of significant seismic events in Trinidad and Tobago

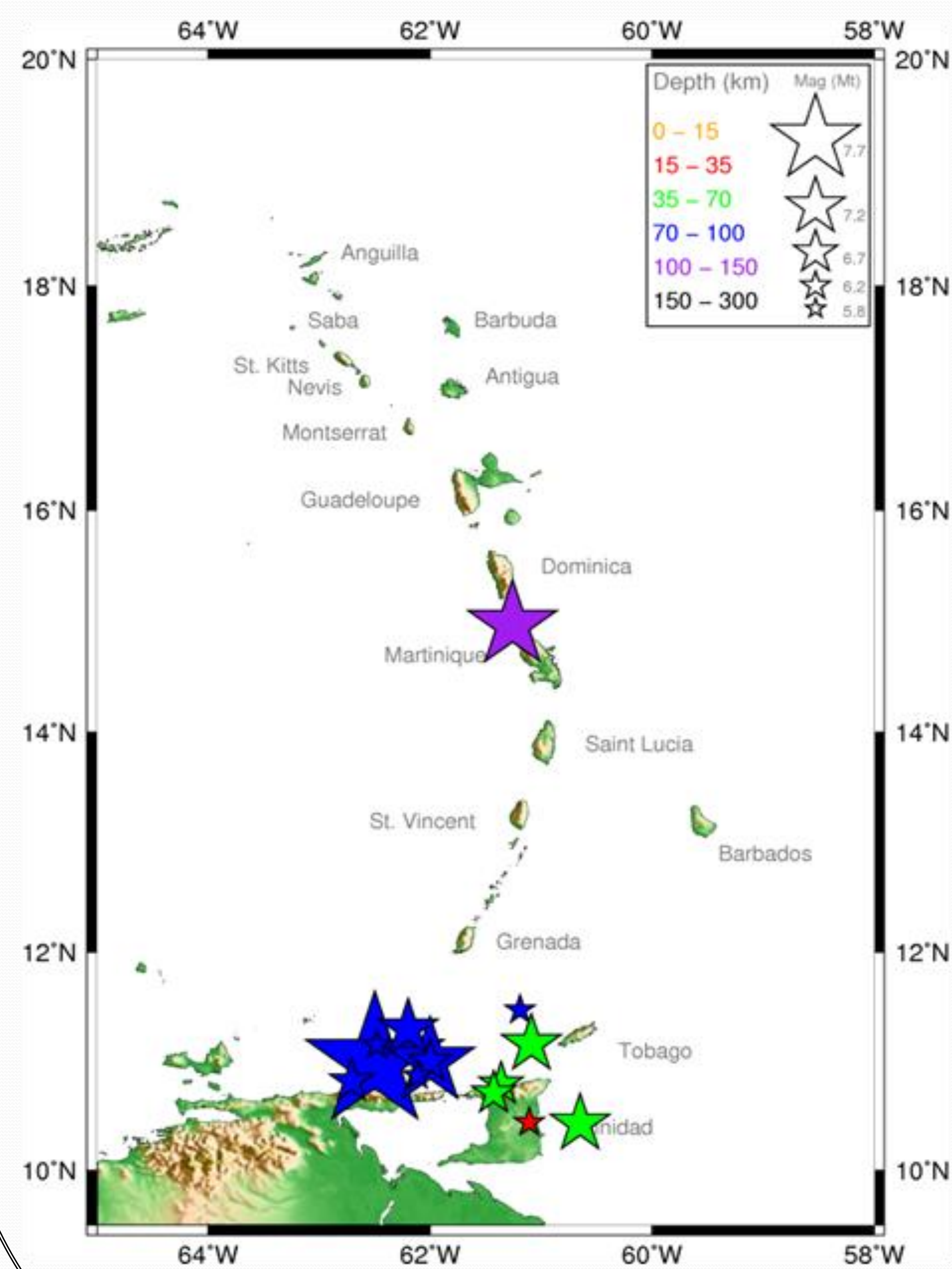


Fig. 4 – Map of significant seismic events in Trinidad and Tobago

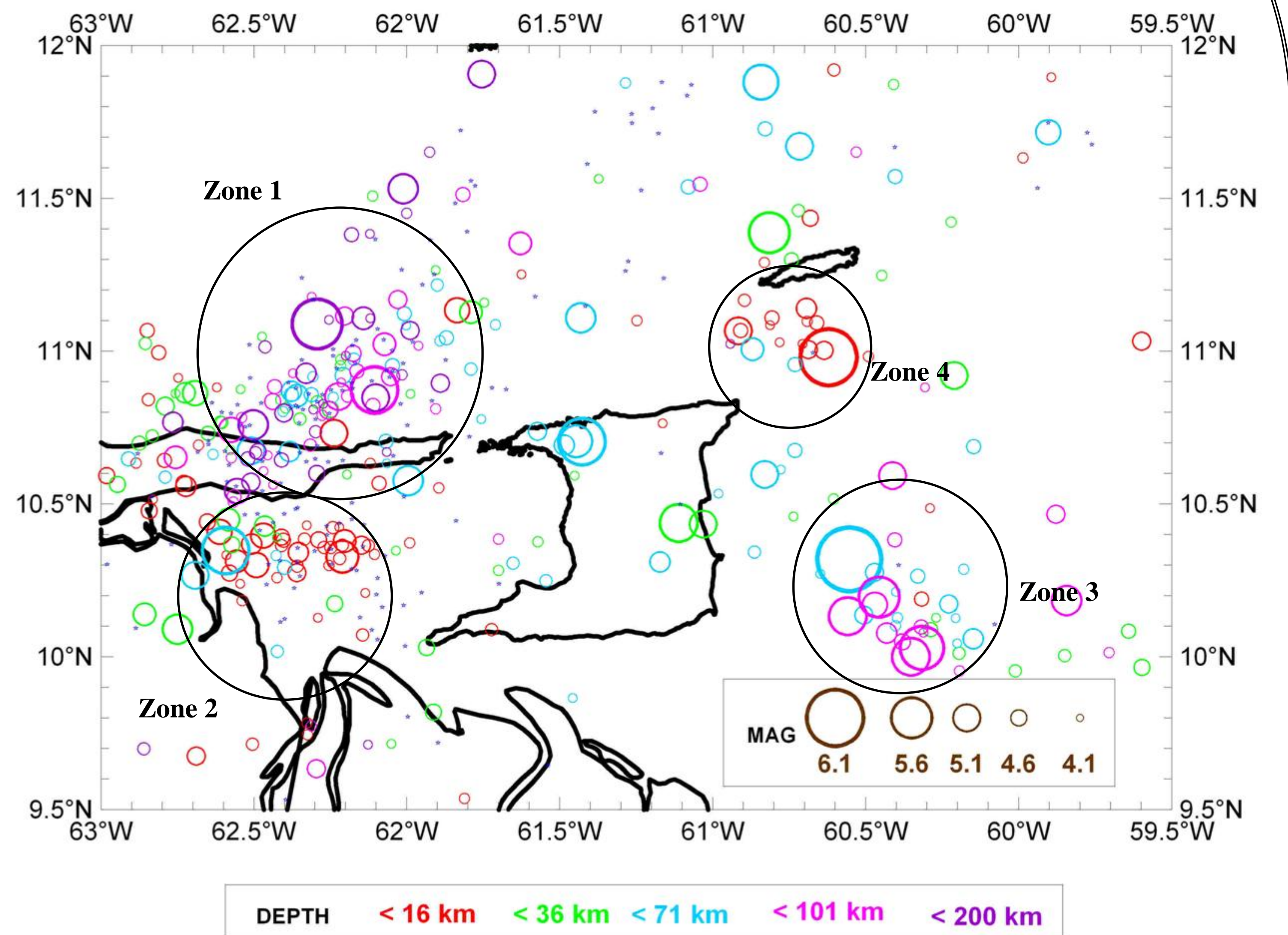


Fig. 1 – Map of source zones surrounding Trinidad and Tobago

Released Energy vs. Epi-central Distance (Trinidad)

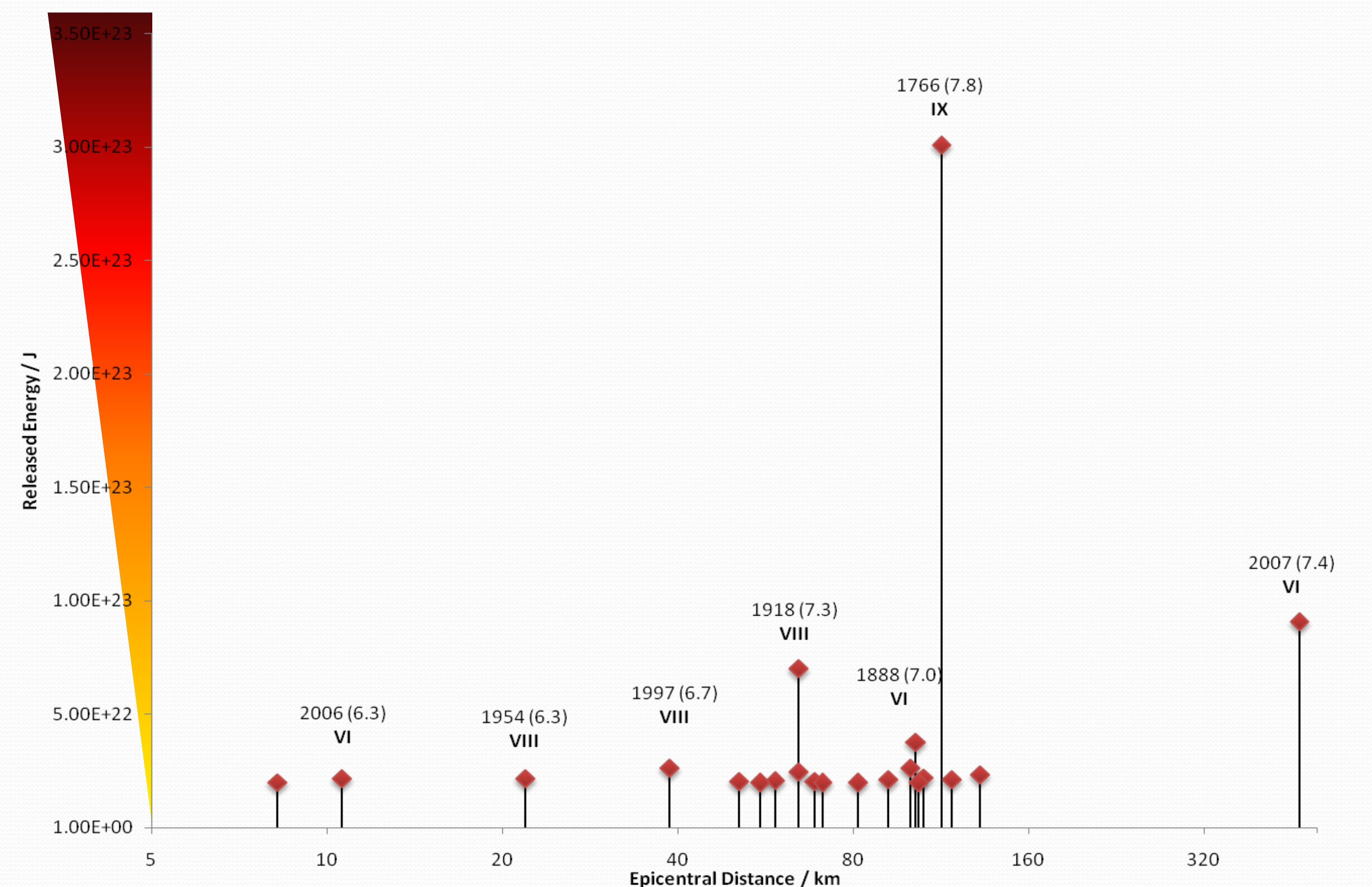


Fig. 3 – Graph of significant seismic events in Trinidad and Tobago showing energy released and distance from P.O.S

Potential

Generally, earthquakes are most destructive when they occur at very shallow depth and in close proximity to highly developed and densely populated areas. These three factors combined with deadly effect on January 12th, 2010 when over 250,000 people were killed in Port-au-Prince, Haiti. The adjacent map shows the location relative to Trinidad and Tobago of several major events in history. The size of the star is proportional to the magnitude of the event and its colour corresponds to its depth. Scientific research and past events suggest that the possibility exists that an event of sizeable magnitude can occur within a calamitous proximity to Trinidad and Tobago. Both islands have been spared major calamity in the past, but increased population and urban development have increased the potential for catastrophe.