



Potential Field Investigations in the Eastern Tennessee Seismic Zone

Pierre Arroucau (1), Gordana Vlahovic (1), and Chris Powell (2)

(1) Center for Research Excellence in Science and Technology, North Carolina Central University, Durham, United States (parroucau@nccu.edu), (2) Center for Earthquake research and Information, University of Memphis, Memphis, TN, United States

Located in the East of the North American continent, at the southern edge of the Appalachian range, the Eastern Tennessee Seismic Zone (ETSZ) is a northeast trending, 300 km long by 100 km wide, zone of diffuse seismicity, and is considered as the second most active region of the United States east of the Rocky Mountains. As often in intraplate continental interiors, this seismicity is characterized by mid-crustal, moderate magnitude earthquakes, whose distribution shows little correlation with surface geology. On the other hand, these earthquakes appear to align along a well-defined linear magnetic feature, called the New York-Alabama Lineament (NYL), which cuts across the seismic zone and is attributed to a strike-slip fault affecting the Precambrian basement. This, as well as some relationships between the earthquake distribution and the body-wave velocity field obtained from local earthquake tomography, suggests that producing accurate images of the geological structure of this region at depth could help to unveil important information about its seismicity. In this work, we thus derive geological cross-sections from 2D inversion of publicly available gravity and magnetic datasets, as an attempt to identify the possible relationships between the seismic activity of the ETSZ and the structure inherited from its past geological history.