Multi-disciplinary observations of Pre-earthquake processes in support of earthquake prediction studies

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We summarized a multi-year research effort on several wide-ranging observations of pre-earthquake processes. Based on space and ground data we present new results relevant to the existence of pre-earthquake signals. Recent large magnitude earthquakes in Asia, Central America and Europe have shown the importance of these various studies in the search for earthquake precursors either for forecasting or predictions. Some new results were obtained from modeling of the atmosphere-ionosphere connection and analyses of seismic records (foreshocks /aftershocks), geochemical, electromagnetic, and thermodynamic processes related to stress changes in the lithosphere, along with their statistical and physical validation. This cross - disciplinary approach could make an impact on our further understanding of the physics of earthquakes and the phenomena that precedes their energy release. For recent events, we present results of synergistic observations of pre-earthquake activates related to 2015 Nepal M7.8, 2015 Chilean M8.5 and 2017 Mexican M8.2 earthquakes and the potential impact of these interdisciplinary studies to earthquake predictability. A detail summary of our approach will be subsequently published in a new volume as part of the AGU/Wiley Geophysical Monograph series and is intended to show the variety of parameters seismic, atmospheric, and geochemical and the historical perspective of this research and could bring this topic to a broader geosciences community.

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