

WHAT WE KNOW AND WHAT WE DON'T KNOW ABOUT THE EARTHQUAKES IN THE VRANCEA REGION (ROMANIA)

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Abstract. *Vrancea is one of the few seismic sources on the Globe that generates major earthquakes (7 to 8 magnitude) at intermediate depth (60 – 180 km) in a very confined seismogenic volume (seismic nest). Understanding how these earthquakes are generated is of wide interest both scientifically and considering the major impact of these earthquakes in Romania and neighbouring countries. The present paper is an overview of what we know at present and what still remains to be clarified in the future regarding the seismic process in the Vrancea area. The prominent features of the Vrancea prone-earthquake system are critically presented discussing their consistency with observation data, concordances and discrepancies and how to interpret them in the light of the latest research. Key elements are analysed related to geodynamic modelling (nature of the cold and dense material descending into the mantle, coupling of the Vrancea slab with the overlying continental crust) and seismicity patterns showing specific characteristics as geometrical configuration in consistency with the predominant focal mechanism and possible physico-geochemical reactions at critical temperature-pressure conditions.*

Keywords: Vrancea seismic source, seismic nest, seismicity patterns, geodynamic modelling, critical phenomena

DOI <https://doi.org/10.56082/annalsarscipphyschem.2023.1.58>

1. Introduction

Vrancea is one of the few seismic sources on the Globe that regularly generates major earthquakes (magnitudes up to 8) in an extremely limited seismogenic volume situated at intermediate depths (60 – 180 km). The physico-chemical modelling of the processes that take place in this volume still remains a mystery and a challenge for scientists, both at the scale of an individual event and at the scale of the entire geodynamic system located in the upper mantle beneath the curvature of the South-Eastern Carpathians arc. Besides the strictly scientific interest, the problem of understanding of how the earthquakes in Vrancea are

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