UNIVERSITÄT BAYREUTH

ACADEMIA ROMÂNĂ

**INQUA–INTAV INTERNATIONAL FIELD CONFERENCE AND WORKSHOP**

# Crossing New Frontiers - Tephra Hunt in Transylvania 24-29 June 2018 in Romania, Europe



**Presentations**

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## Improving our understanding of Southeast Asian volcanic eruption histories, with an emphasis on Sumatra (Indonesia)

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Improving our knowledge of volcanic eruption histories in Southeast Asia is important for a number of factors, the most obvious of which is regional hazards. Southeast Asia hosts ~750 volcanoes (70 of which have erupted in the past century) and is home to a population of ~600 Million. In Indonesia, for example, ~30% of the population lives within 30 km from a Holocene volcano. Another important factor is that Southeast Asian volcanoes are dominantly located close to the equator. Large volcanic eruptions that send ash into the stratosphere have particularly global impacts on climate when they occur in equatorial to tropical regions because the ash and aerosols released propagate into both hemispheres.

We review the current knowledge about Southeast Asian volcanoes and their eruption histories, and focus on identifying tephrochronologic markers in order to further future paleoclimate and volcanological studies. In parallel, we expand the current knowledge with a tephrostratigraphy study in Sumatra (Indonesia) in order to reconstruct the eruptive history of this particularly understudied but yet hazardous region.

143 volcanoes in Southeast Asia have been classified as Large Calderas (41) and Well-Plugged Stratocones (102) by Whelley & al (2015) and thus have or are likely to have produced large explosive eruptions with a Volcano Explosivity Index (VEI) of 5-8. Only 26 such eruptions have known ages, spanning from 1.2 Ma to 1991 AD. Fewer have geochemical data that can be used for tephrostratigraphic correlations. Large explosive eruptions from Sumatran volcanoes are generally very silicic (dacitic to rhyolitic), while those from Javanese volcanoes are intermediate (andesites) and those from the Sunda-Banda Arc are mafic (basalts to basaltic-andesites), reflecting the gradual eastward change in geodynamic parameters. Eruptions from the Philippines range in composition from basaltic-andesites to dacites. Along-arc we find that Y contents and 86/87Sr ratios vary consistently and are thus good discriminators of volcanic sources. The Young (75 ka) and Old (~800 ka) Toba Tuffs are frequently used as tephrochronological markers given their widespread occurrence and detailed characterization. However, a closer look at Sumatran volcanics reveals other large caldera-forming eruptions with potentially similar ages. Determining the age and geochemical characteristics of other unstudied calderas will greatly enhance our understanding of the frequencies of such events and enable solid correlations with tephra layers found in distal locations.

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| Submitted as: | Oral presentation in 5 The interplay of physical volcanology, tephrochronology, and petrology in understanding volcanoes |
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