Uncharted archives - imprints of tsunami backwash deposits on the Algarve shelf (Portugal)

Piero Bellanova1, Klaus Reichert1, Pedro J.M. Costa1,4, Lisa Feist1, Mike Frenken1, Jan Schwarzauer2, Juan I. Santisteban3, Andreas Vöö3, Ivana Bosnic3, Helmut Brückner5, Holger Schultrumpf1, César Andrade6, João F. Duarte7, Jannis Kuhnmann8 and the M152 scientific team

Interpretation

Sedimentology - magnetic susceptibility - grain size analysis - P-waves
Geophysics - sub-bottom profiler - hydroacoustics

Geochemistry - handheld XRF - XRF core scanner - organic geochemistry - biomarker analysis

Results

Conceptual model for offshore tsunami backwash deposit generation
- causing erosion, transport & deposition seawards.
- coastal vicinity = erosion dominated
- further on the shelf = offshore deposition, traction & suspension in basins

Event 1
- Age (°C): between 1057 - 171 cal. BP (described as AD 1735 Lisbon tsunami)
- Sediment characteristics: 3-6 cm thick bioclastic sand/gravel layer sharp upper contact less defined basal contact
- Geochemical signature: post-event environmental changes increase in PAHs terrestrial input (piroclastic) backwash effect

Event 2
- Age (°C): between 3721 - 3656 cal. BP (unknown tsunami)
- Sediment characteristics: ca. 25 cm thick well-sorted sand layer shell debris & inverse gradient traction carpet = bedload transport
- Geochemical signature: increase in Si, Ca/Fe & P-waves decrease in Fe, Br, Ti & MS Increase in PAHs terrestrial input (piroclastic) backwash effect

Summary
- Identification of at least two tsunami deposits
  - AD 1755 Lisbon tsunami
  - yet unknown ca 3700 cal BP (1172-1170 BC) tsunami
  - potential other event between AD1755 & 3700 cal BP
- High preservation potential in offshore archives
- Offshore backwash deposits underestimated

Piero Bellanova, Dr. rer. nat.
Tel.: +49 241 89-56756
E-Mail: p.bellanova@rub.rwth-aachen.de

References

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Corresponding EGU contributions

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