Structural decoupling in the forearc region of southern Crete: Significance for future oil and gas discoveries

Eleni Kokinou; Tiago M. Alves, E. Kamberis

alvest@cardiff.ac.uk
School of Earth and Ocean Sciences

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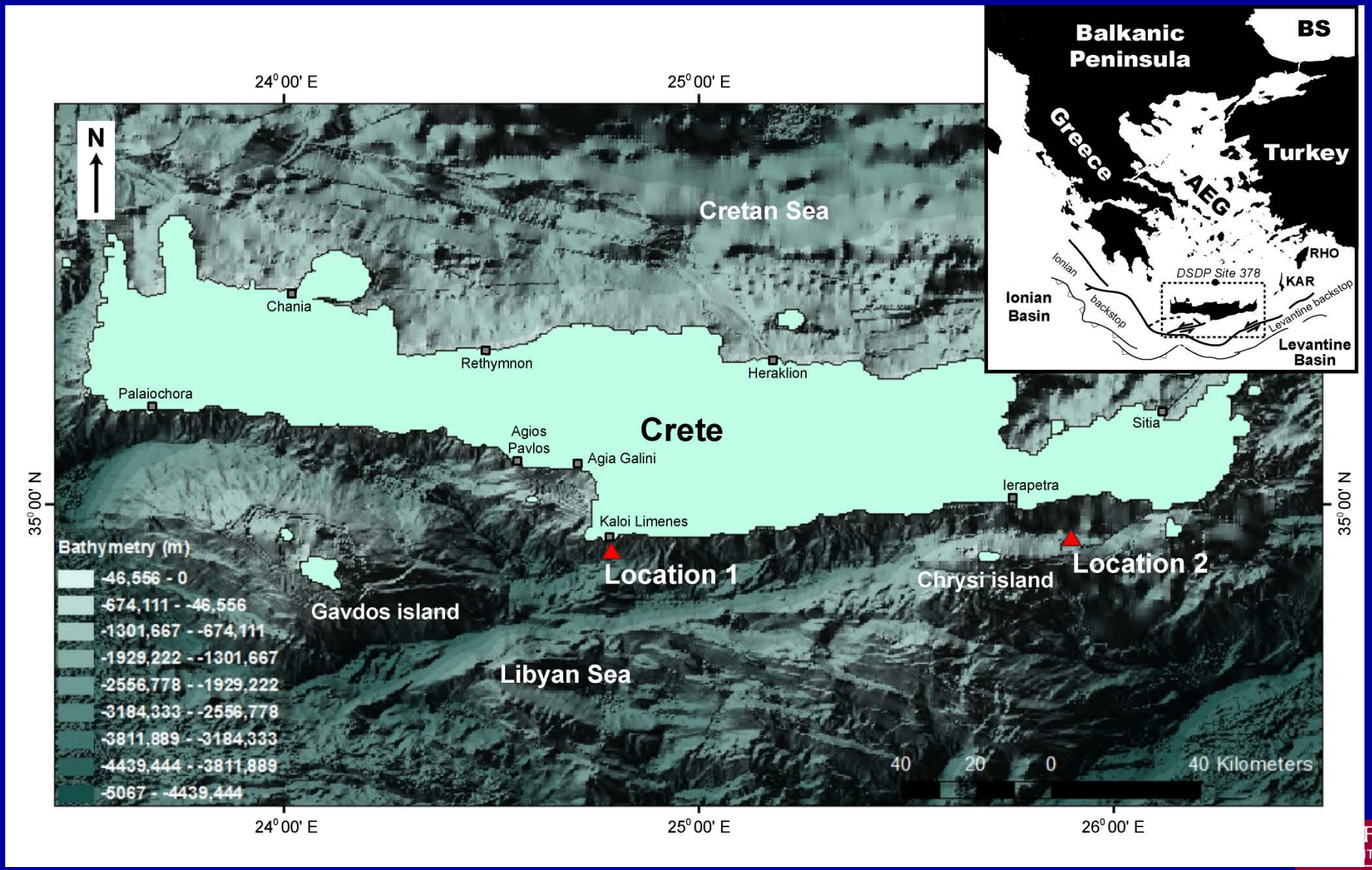
The case for transtension in S Crete into Cyprus



Summary

- Background: Seismic and structural setting

- Understanding the seismological record in Crete

  a) Moment-tensor solutions

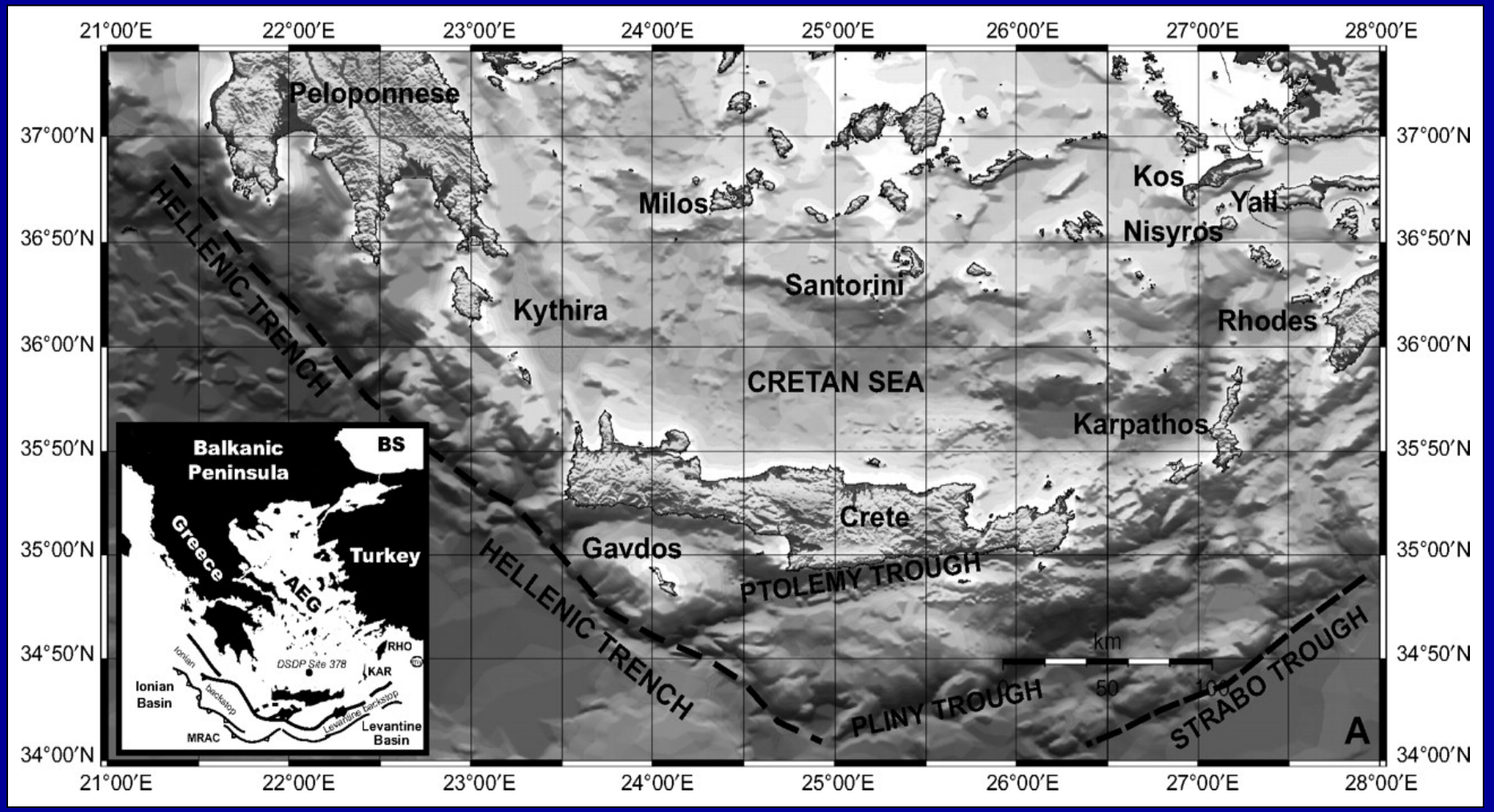
  b) Seismic data (single-channel)

  Interpretations and conclusions

Part 1

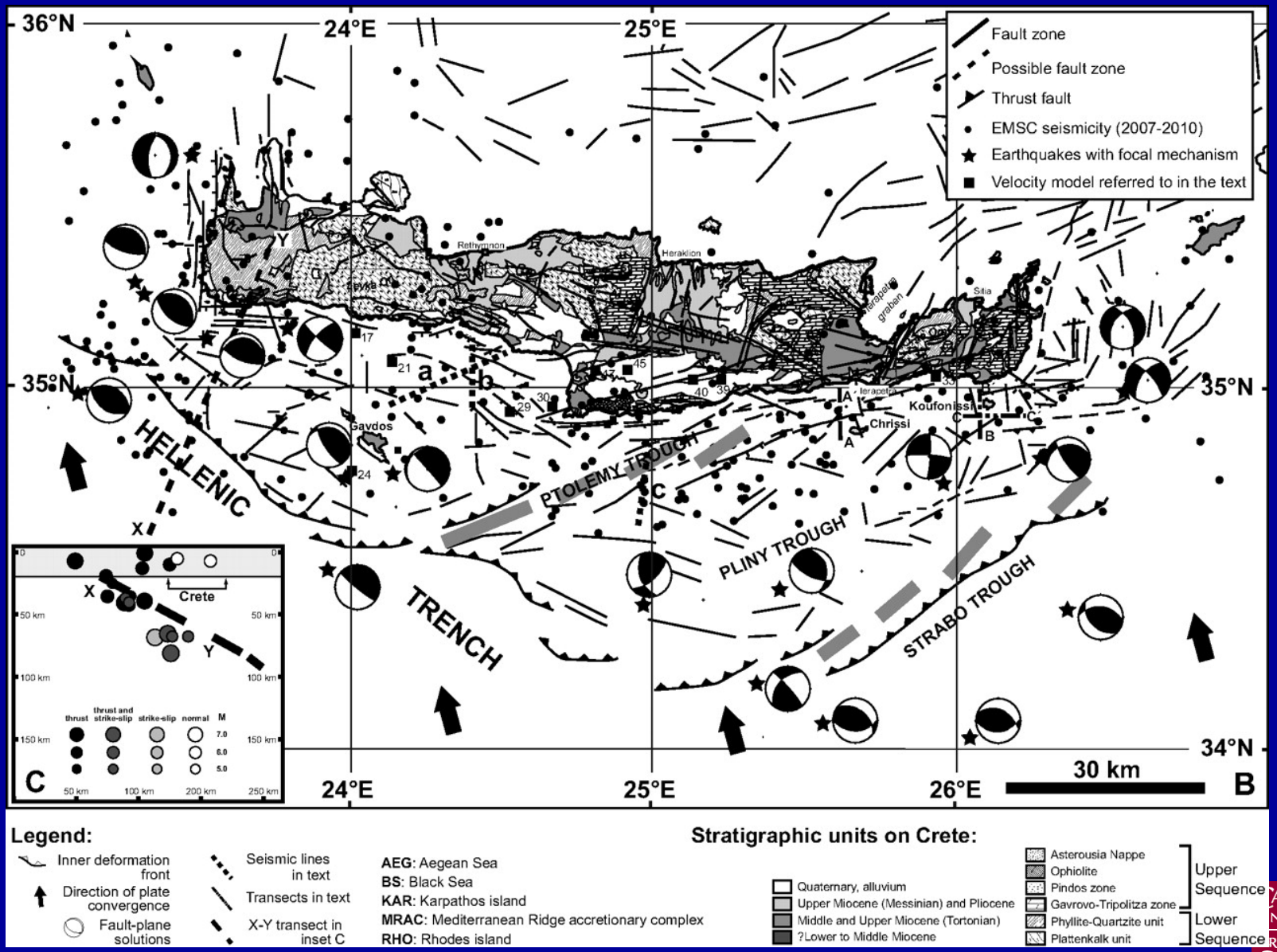
Research Rationale
(SE Crete)

Study area

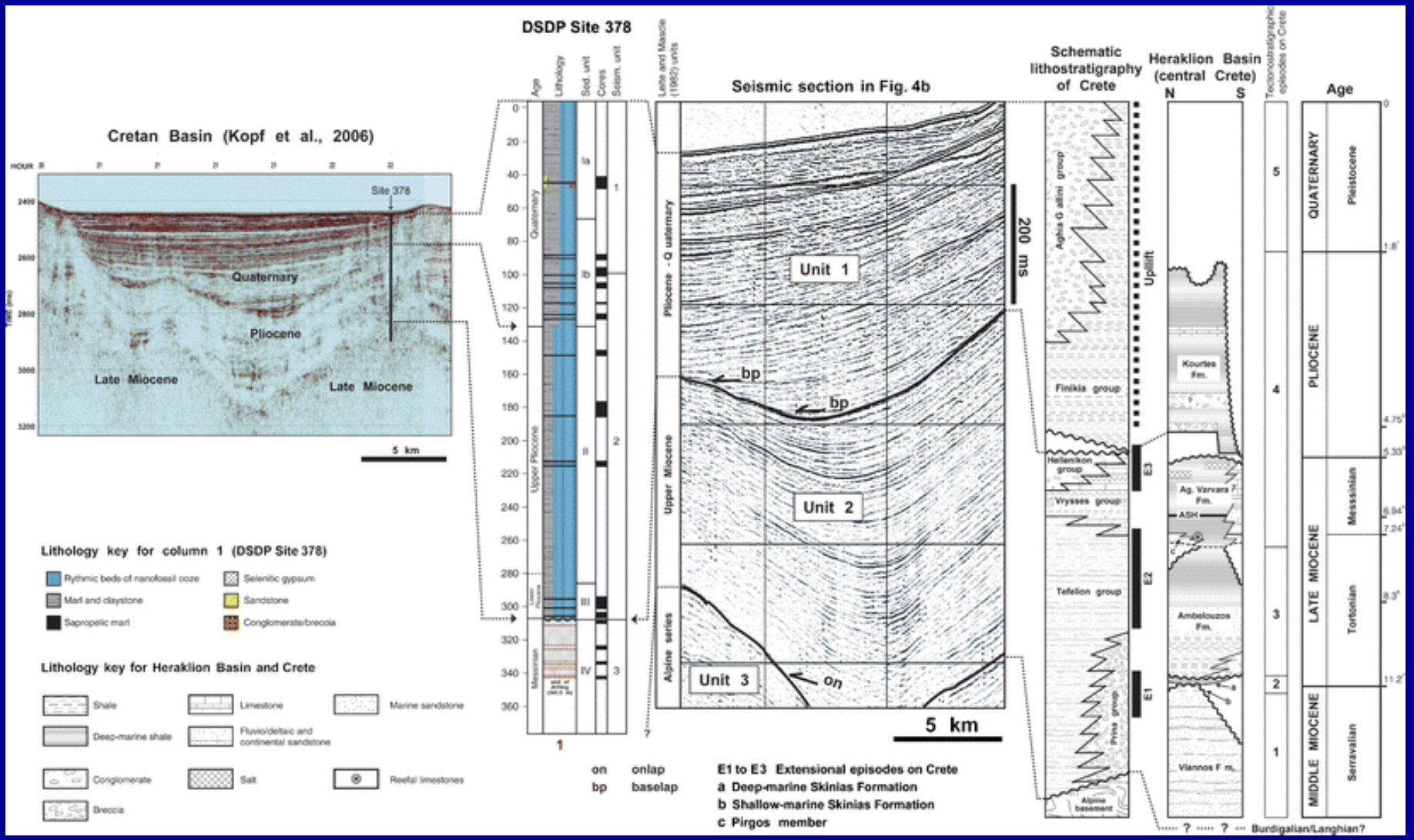


Kokinou, Alves and Kamberis (2012). GSA Bulletin
Bathymetric data from EMODNET and GEBCO

Moment tensor solutions

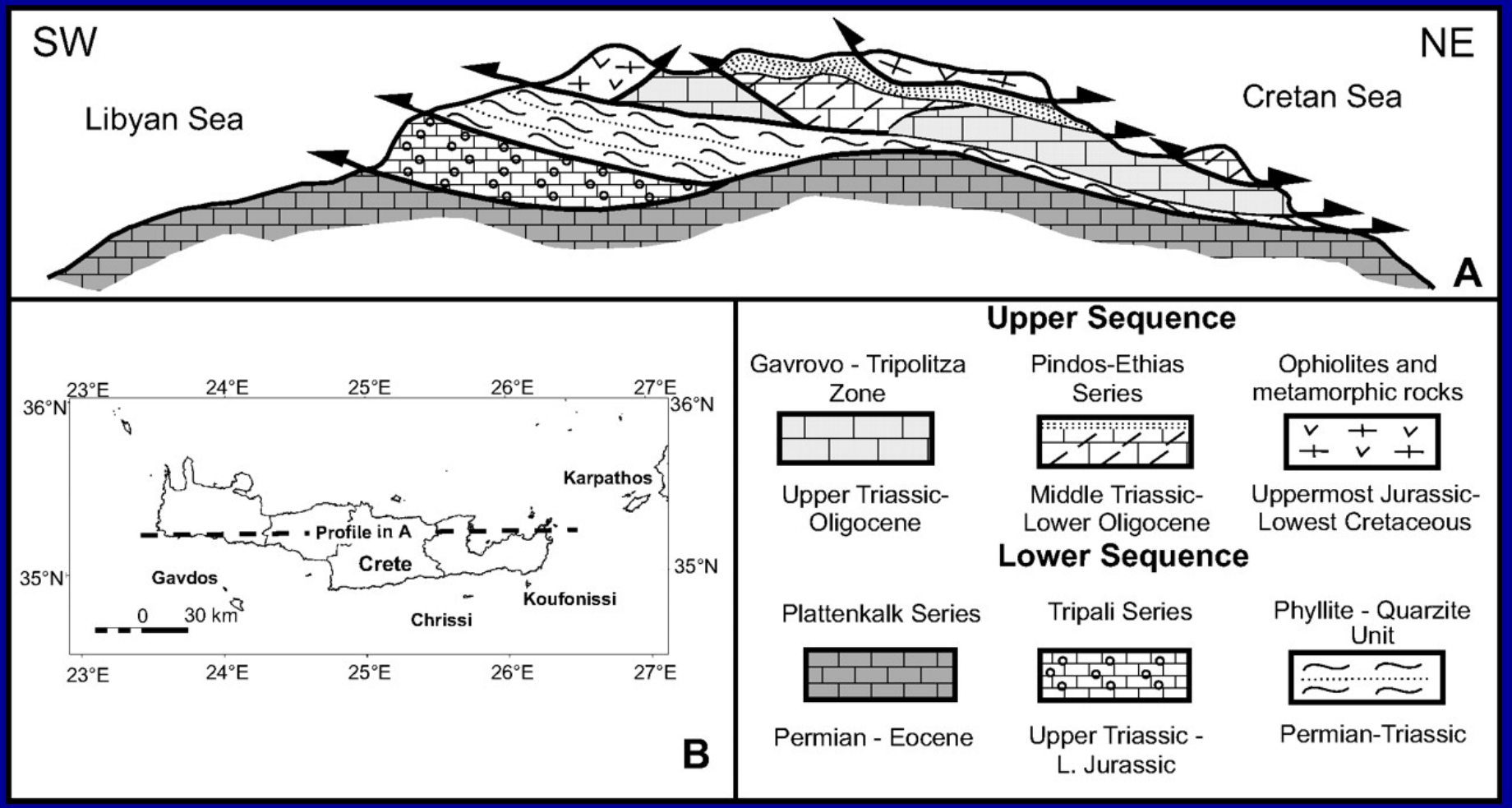


Offshore stratigraphy



Alves et al. (2007). Geo-Marine Letters

Onshore structure (pre-Miocene extension)

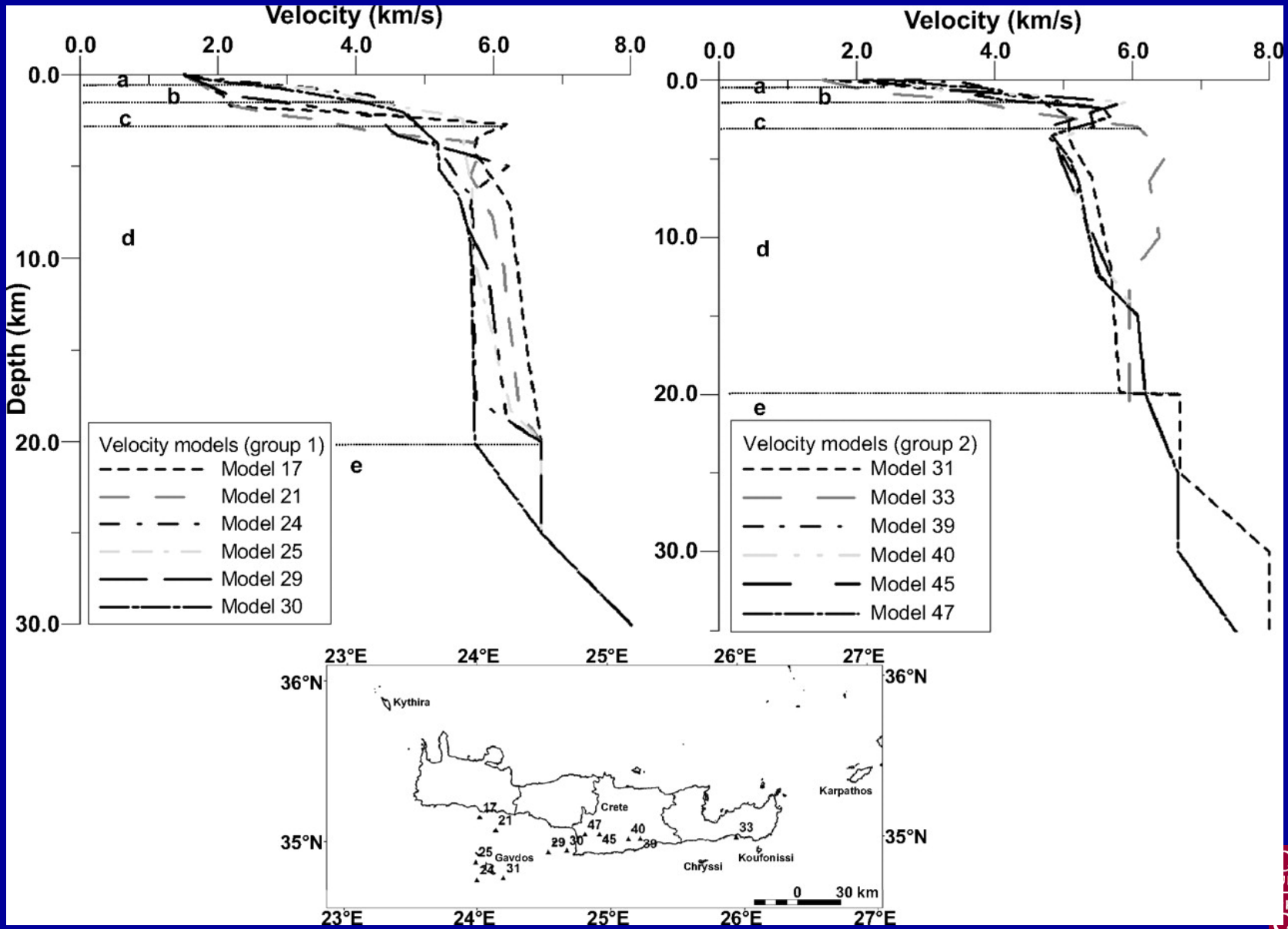


Kokinou, Alves and Kamberis (2012). GSA Bulletin

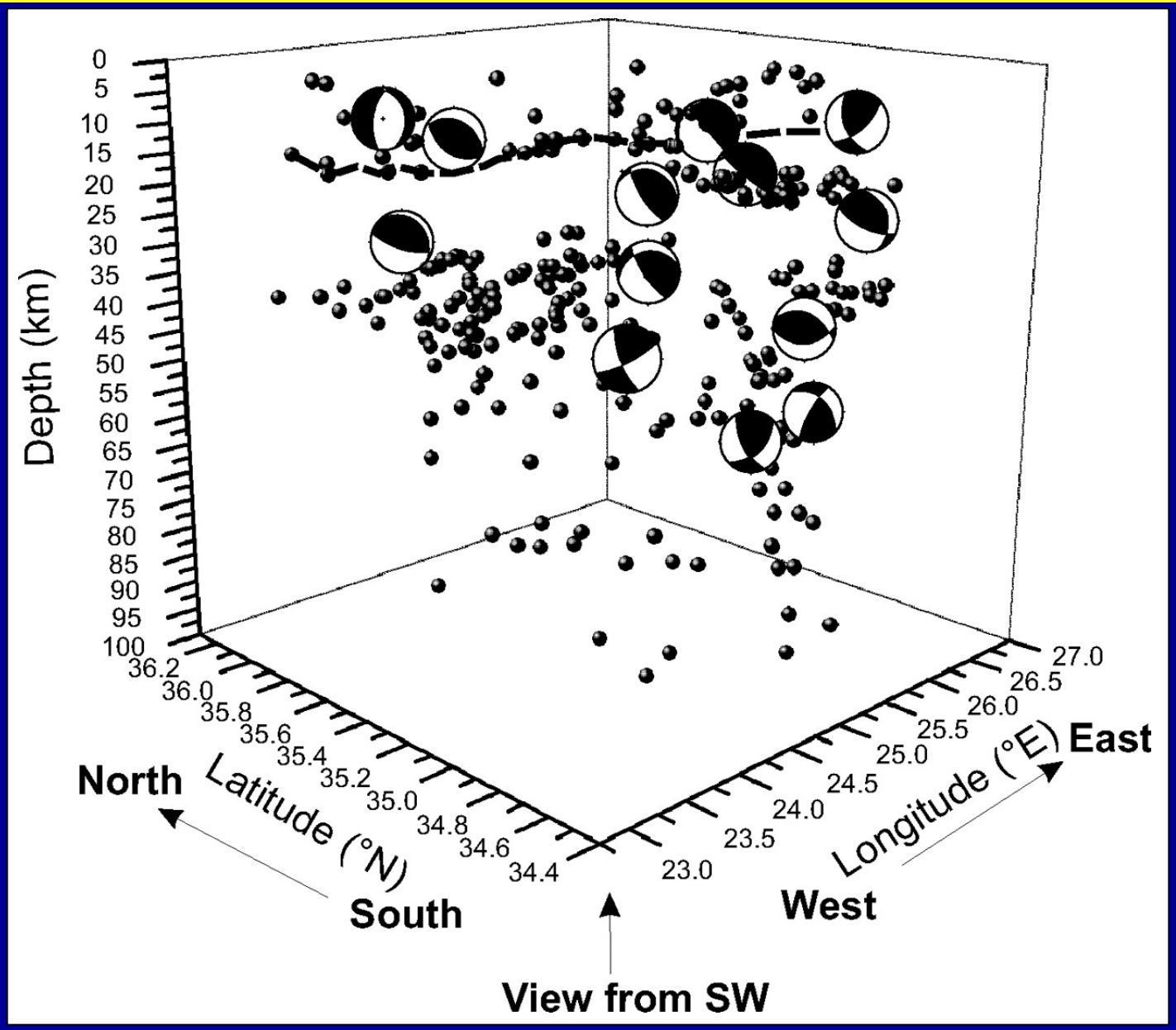
Moment Tensor Data

Recognising crustal zones based on seismological data

Velocity vs. depth offshore Crete



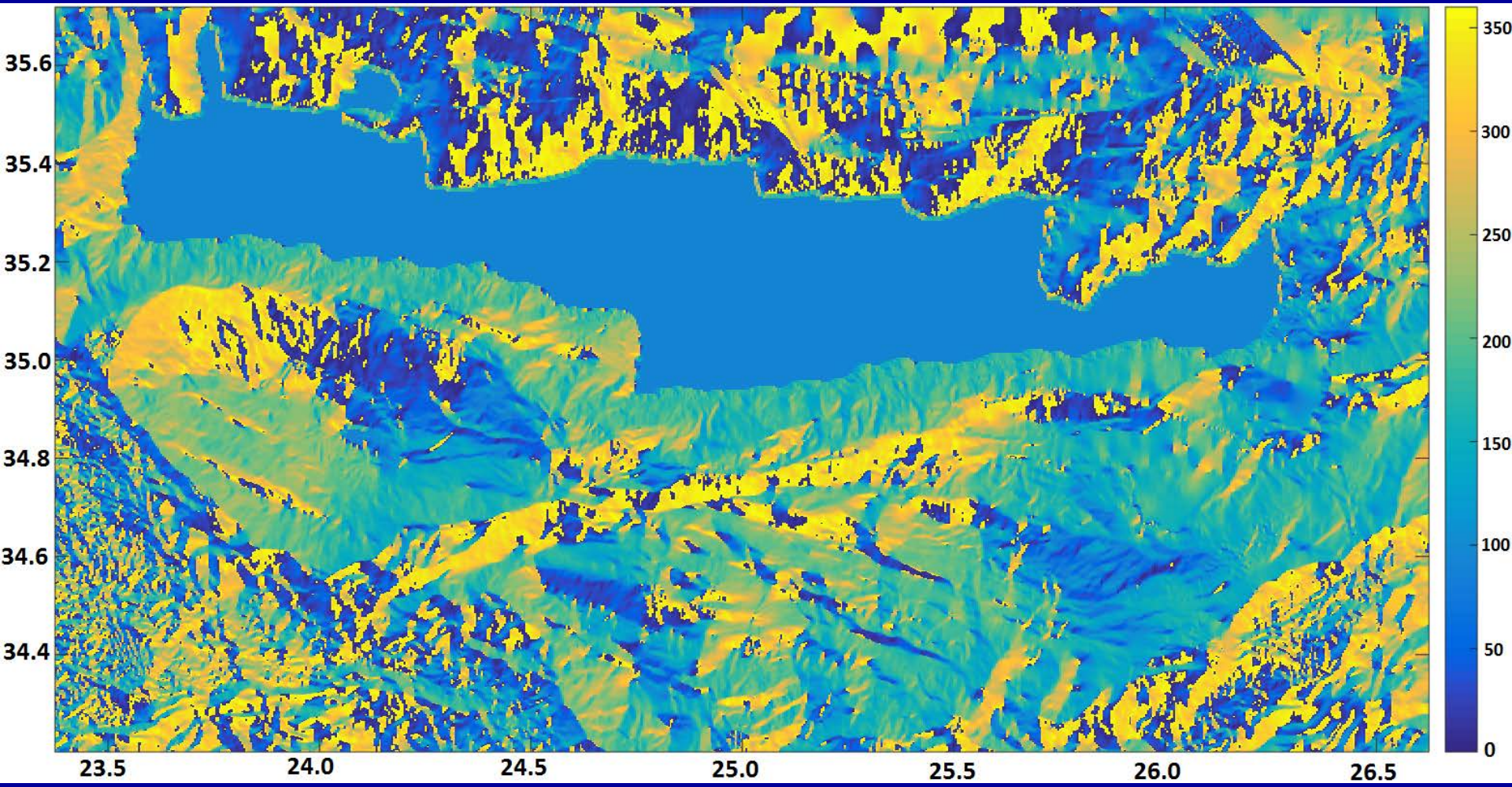
Field data - Crete: Ravines and chasms



Seismic Data

Basins and sediments in offshore troughs

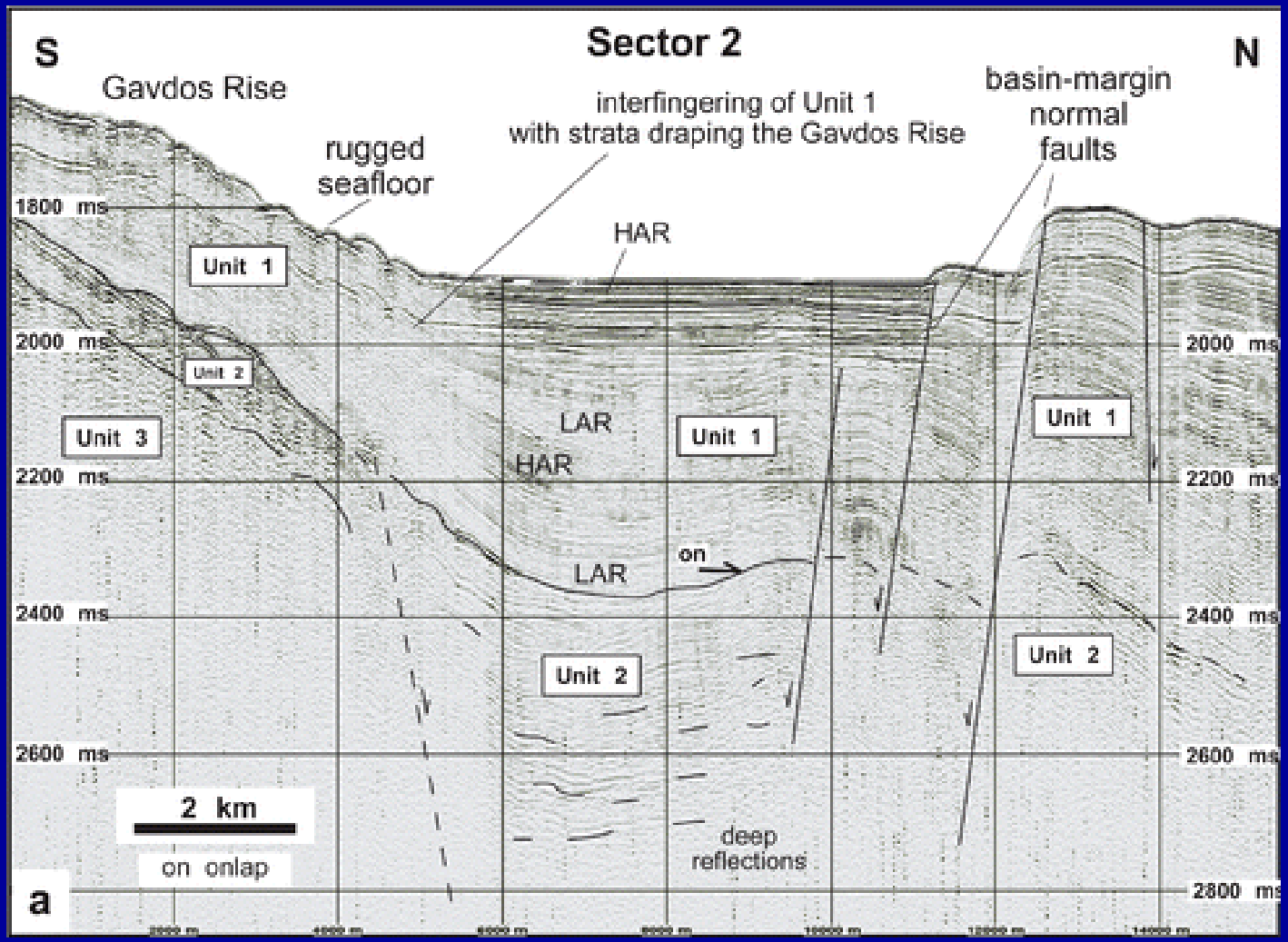
Large basin-bounding faults



Large basin-bounding faults onshore

Alves (2017). Sedimentology, in preparation

Offshore Crete: N70 faults



Alves et al. (2007). Geo-Marine Letters

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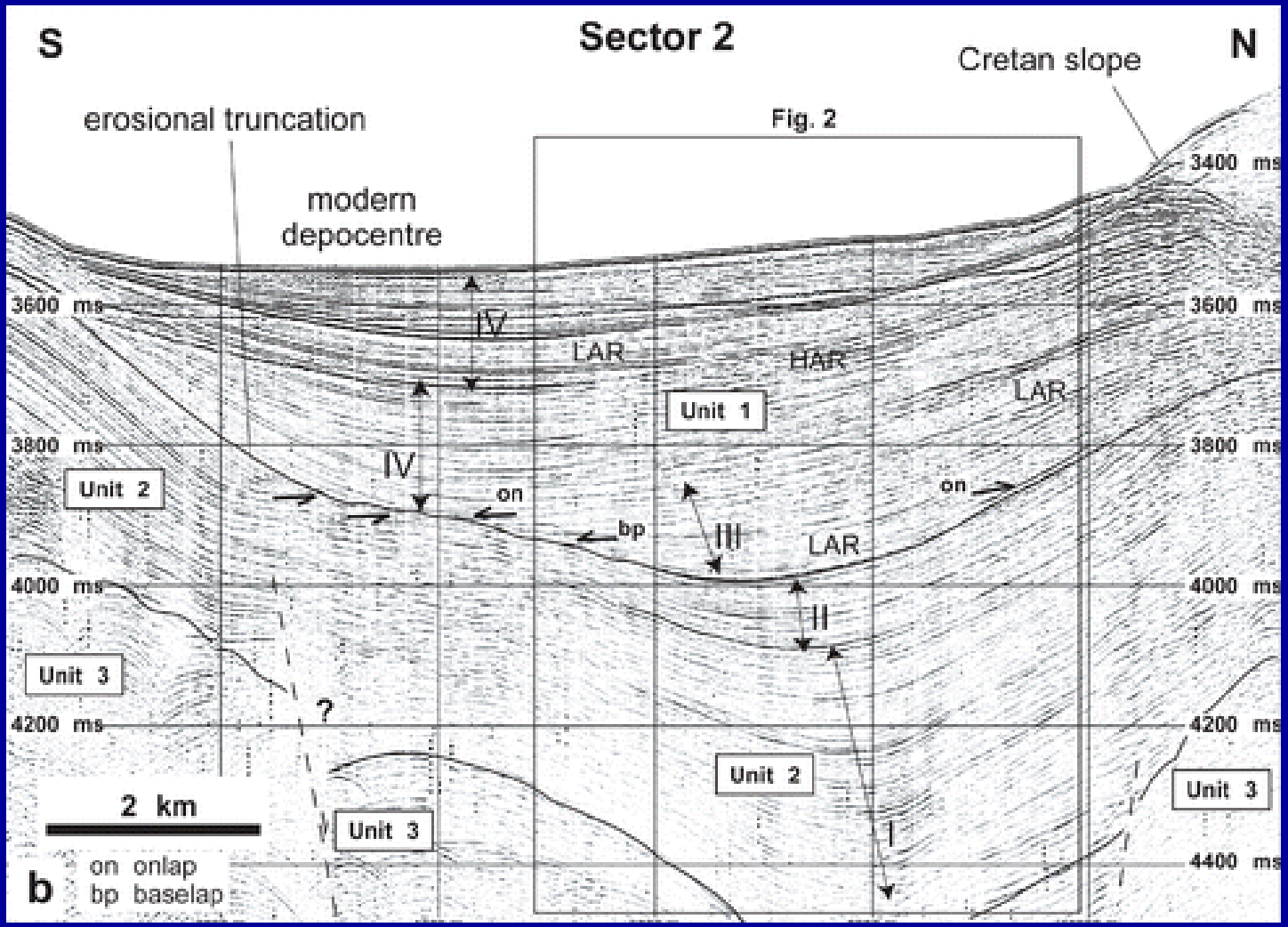
Offshore Crete: Main depocentres



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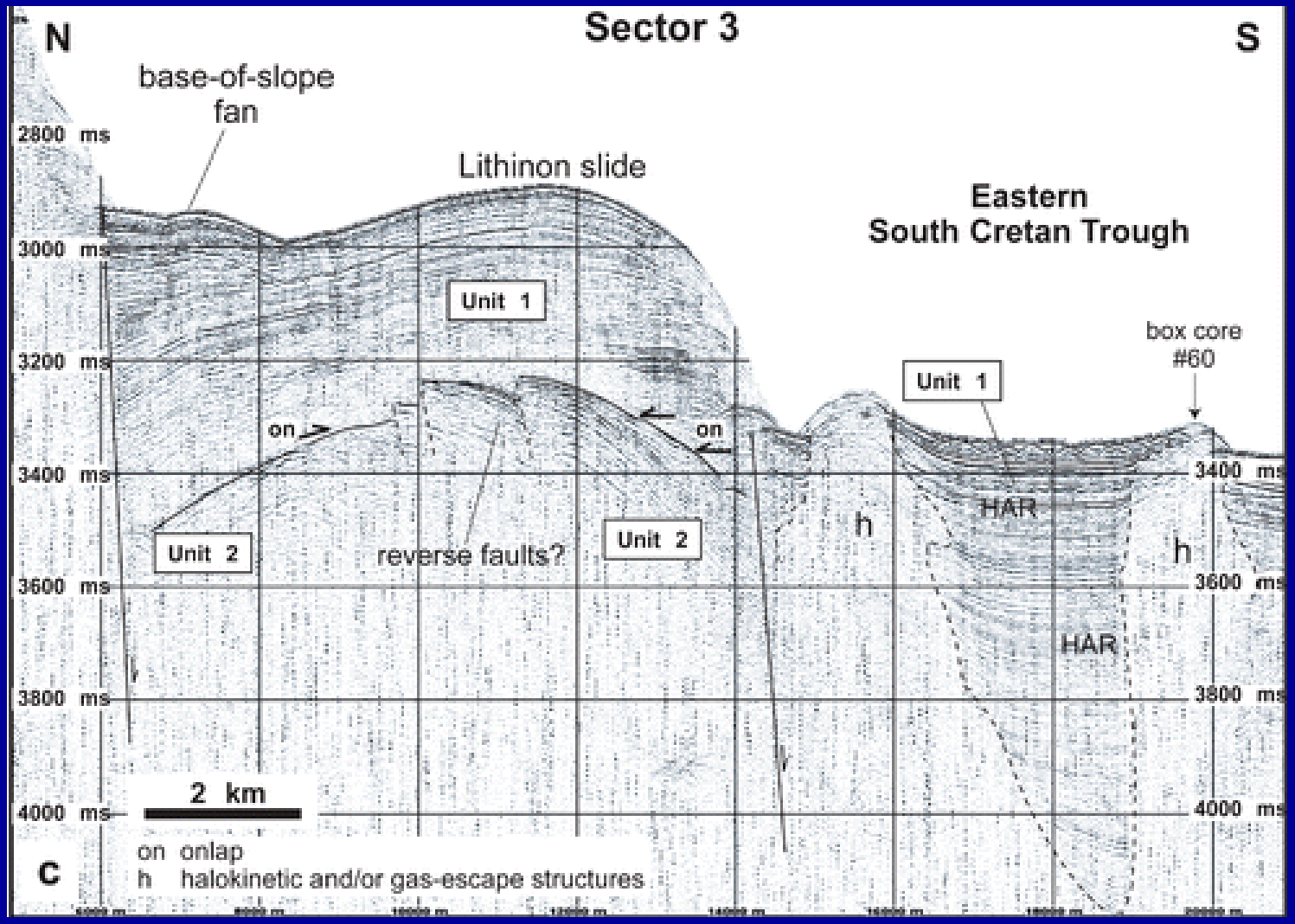
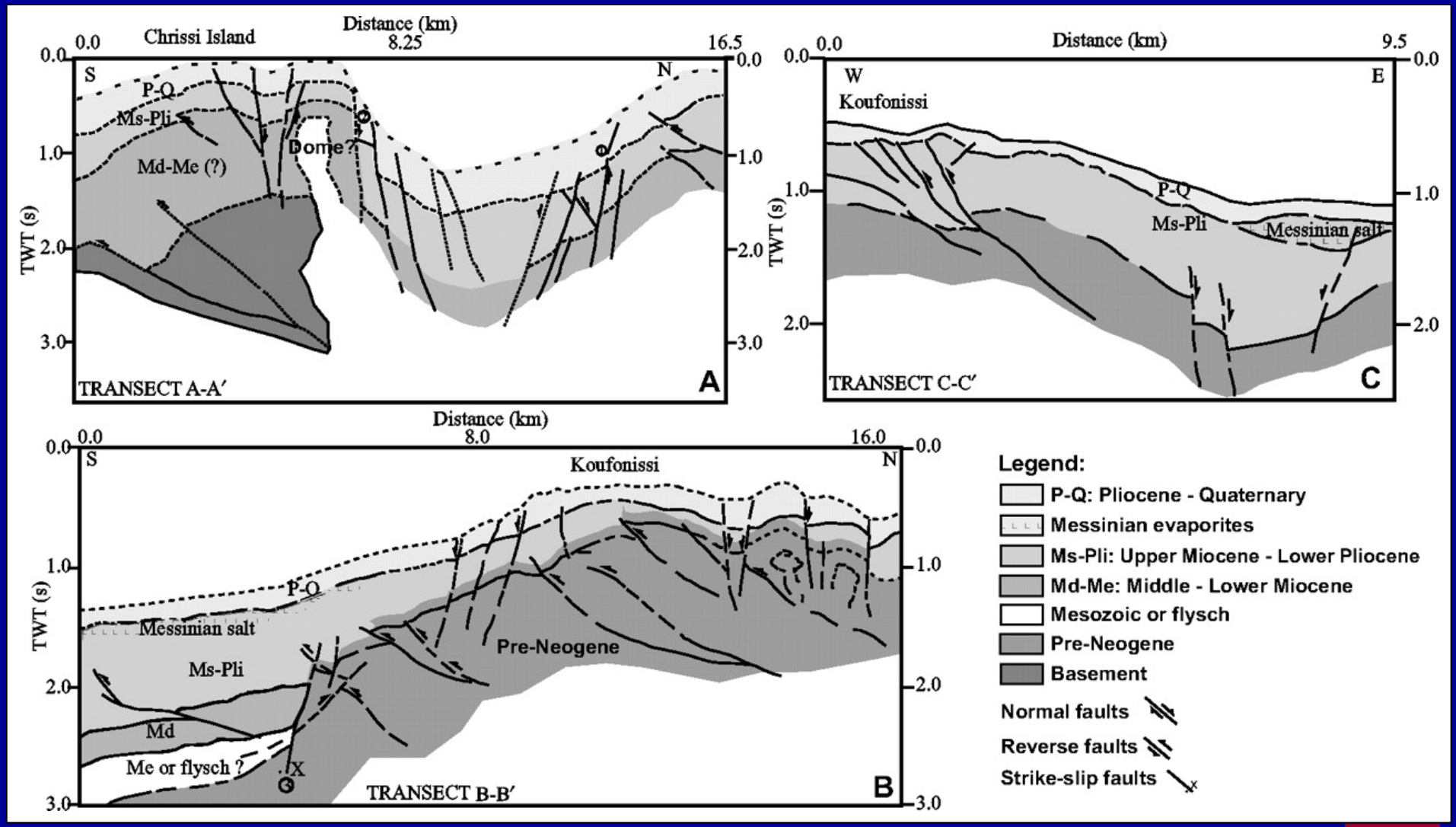
Field data - Crete: Ravines and chasms



Alves et al. (2007). Geo-Marine Letters

CONCLUSIONS AND IMPLICATIONS

Industry data: Transtensional structures



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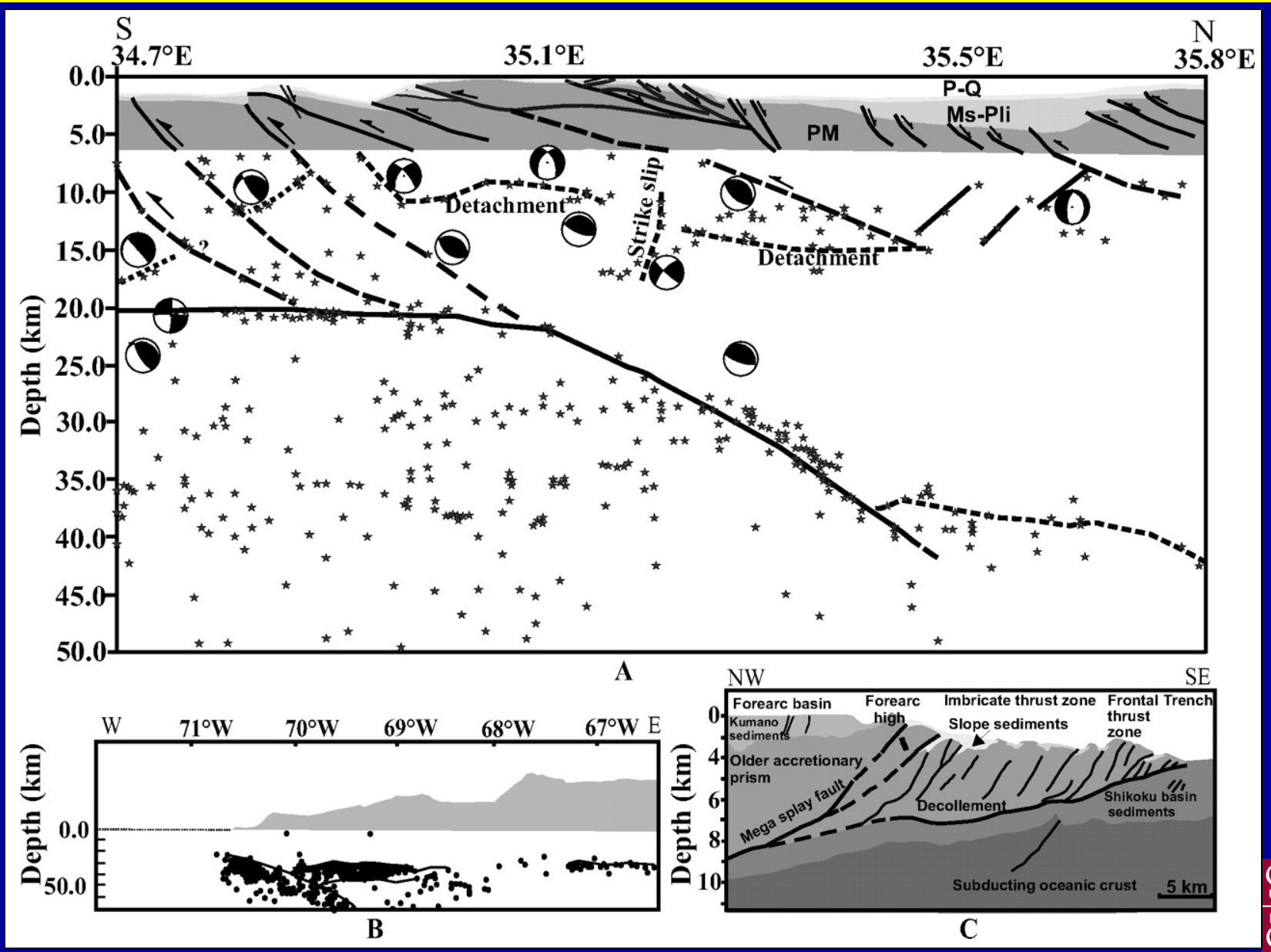
Seismological record: 0 to 50 km-deep



Conclusions

1. **Decoupling**: Moment tensor solutions change at depths varying from 5 to 15km – from transtension to compression. STRUCTURAL DECOUPLING IS IMPORTANT.

2. **Reasons for decoupling**: Rheological boundary may be present. We make an analogy with NW Greece to suggest the PRESENCE OF BASAL SALT (Triassic – Early Jurassic).

3. **Impact on HC plays**: Folding and dim zones on seismic data suggest Miocene evaporites too. Alternatively, local restraining bends are present. ANALOGY WITH CALIFORNIA.