

# **East Indonesia: Plays and Prospectivity of the West Aru, Kai Besar and Tanimbar Area - Identified from New Long Offset Seismic Data - An Update based on further Data Acquisition and Interpretation\***

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Search and Discovery Article #41121 (2013)

Posted May 20, 2013

\*Adapted from extended abstract prepared in conjunction with poster presentation at AAPG Annual Convention and Exhibition, Pittsburgh, Pennsylvania, May 19-22, 2013, AAPG©2013

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## **Abstract**

The authors give an update to their AAPG 2011 paper: East Indonesia: Plays and Prospectivity of the West Aru, Kai Besar and Tanimbar Area - Identified from New Long Offset Seismic Data. The new work is based on the acquisition of further seismic data (in 2012) which extends the original study area further north into the deeper part of the Aru Trough where a Tertiary petroleum system can now be more fully described and assessed. Based on drop core sampling reported by Marathon Oil (2011) this Tertiary petroleum system is possibly oil prone. The new work will also include a look at the potential for these hydrocarbons to migrate to the margins of the Trough - into Mesozoic reservoirs at drillable depths. It is believed that a number of oil companies are chasing this play. The presentation will be illustrated by numerous new seismic sections in depth as well as time.

## **Introduction**

The previous paper was based on 8,400 km of seismic data acquired in 2009/10 (shown in yellow in [Figure 1](#)). The survey indicated multiple play types in this previously overlooked Eastern Indonesian area. Two regular blocks (West Aru I & II) were offered by Migas in the first 2011 bid round and both were picked up, with West Aru II receiving the highest bid of the round with a 15 MUSD signature bonus and a 40 MUSD 3D seismic work program. Subsequent to that, 1,500 km of additional data was acquired by Spec Partners in 2012 (shown in orange) to define the prospectivity to the south and west. This was followed in early 2013 by the acquisition of a further 2,500 line kms of seismic data to the north (shown in red). This work is based on an analysis of that survey data (the 2013 survey).

## **Discussion**

The 2013 survey extends the original study area further north into the deeper part of the Aru Trough where a Tertiary petroleum system can now be more fully described and assessed. Based on drop core sampling reported by Marathon Oil (2011) this Tertiary petroleum system is

possibly oil prone, with hydrocarbon samples typed as Miocene. It is postulated that oil migrated westwards from the Aru Trough onto the Kai-Besar high (which occupies the Kumawa Block) to fill Early and Mid Jurassic marine sandstone reservoirs. These would be sealed by Late Jurassic/Early Cretaceous shales. This concept is shown in [Figure 2](#).

Sections from the northernmost part of our 2010 survey show that hydrocarbons are being generated within the Aru Trough ([Figure 3](#) and [Figure 5](#)):

The potential to trap hydrocarbons on the western margin of the Trough is illustrated in [Figure 4](#), where we see good reflectors and structure within a bathymetric ridge – here named the East Kai Ridge. Mesozoic sediments, and good potential reservoirs, have been penetrated by the Kai Besar 1 well, which is located on the Kai Besar Island immediately west of this Ridge. This Ridge would be a good location to trap hydrocarbons, migrating either from the Tertiary sediments within the Aru Trough or from deeper sources within the Mesozoic of the Island complex – the sandstones being sealed by Late Jurassic to Early Cretaceous shales.

The seismic data also shows that there are possible trapping structures within the Trough itself ([Figure 5](#)).

We can also consider possible hydrocarbon migration eastwards towards the western margin of Aru Island and southwards onto the shelf margins. The latter is illustrated in [Figure 6](#).

The sections shown are from the 2010 survey. The 2013 survey is being acquired at the time of writing (February 2013). The final poster presentation will include data from the new survey and discuss further the potential for hydrocarbons generated within the Aru Trough to migrate to the margins of the Trough – into Mesozoic reservoirs at drillable depths.

An updated version of these extended abstracts will be available from the authors at that time. Please contact [gfr@specpartners.net](mailto:gfr@specpartners.net).

### **Acknowledgements**

We thank Tim Charlton for the updated map in [Figure 1](#) and Marathon Oil for [Figure 2](#).

### **Selected References**

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### **Website**

Marathon Indonesia (Kumawa) Ltd., 2011, Kumawa PSC farmout brochure: Web accessed 10 May 2013.

[http://www.seapex.org/farmout\\_files/8965\\_mikl\\_kumawa.pdf](http://www.seapex.org/farmout_files/8965_mikl_kumawa.pdf)

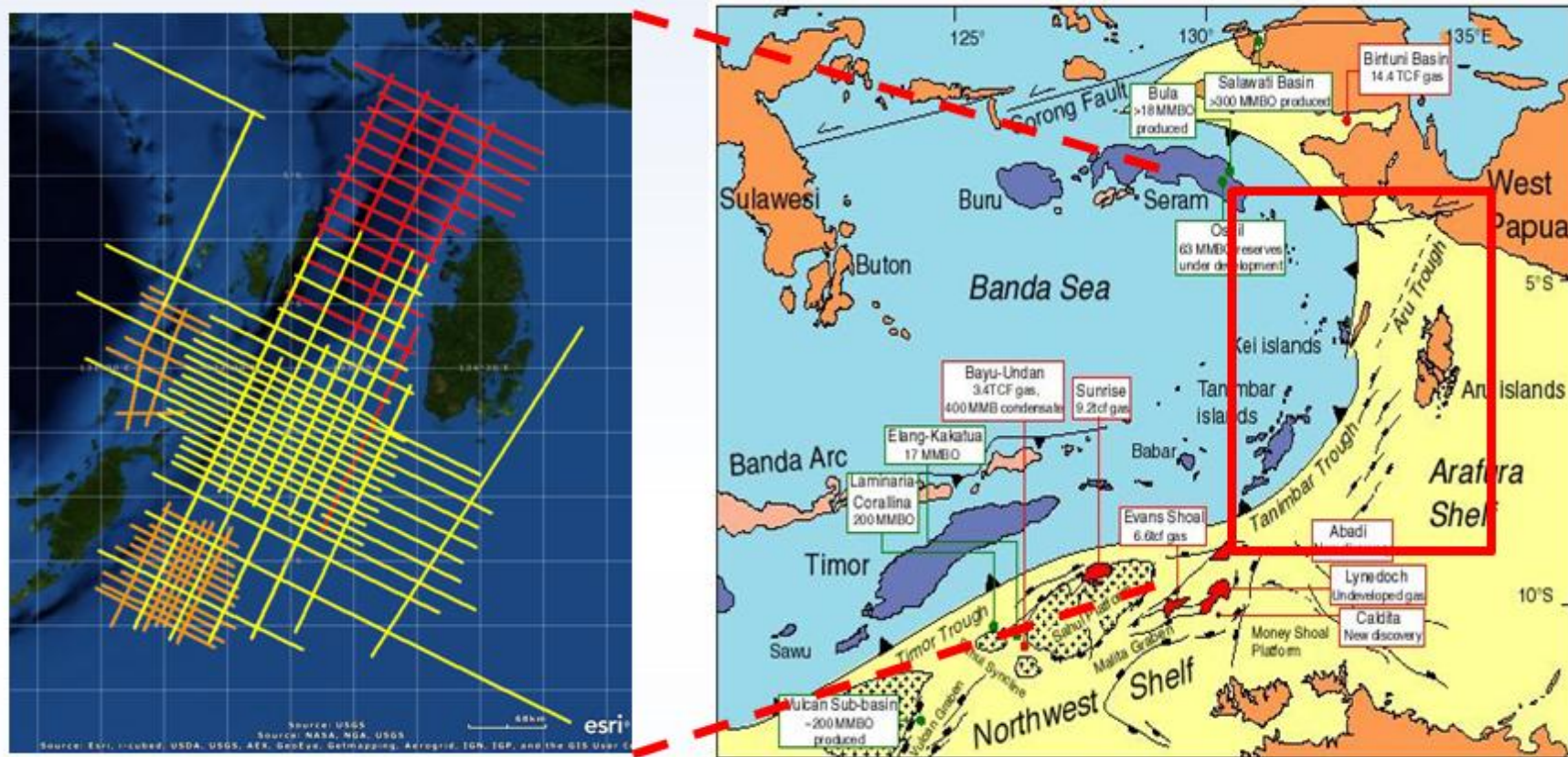


Figure 1. Study area with the new 2013 seismic lines shown in red. Location also shown on Structural elements map (Charlton 2004, updated 2011)

# Kumawa Play Concepts

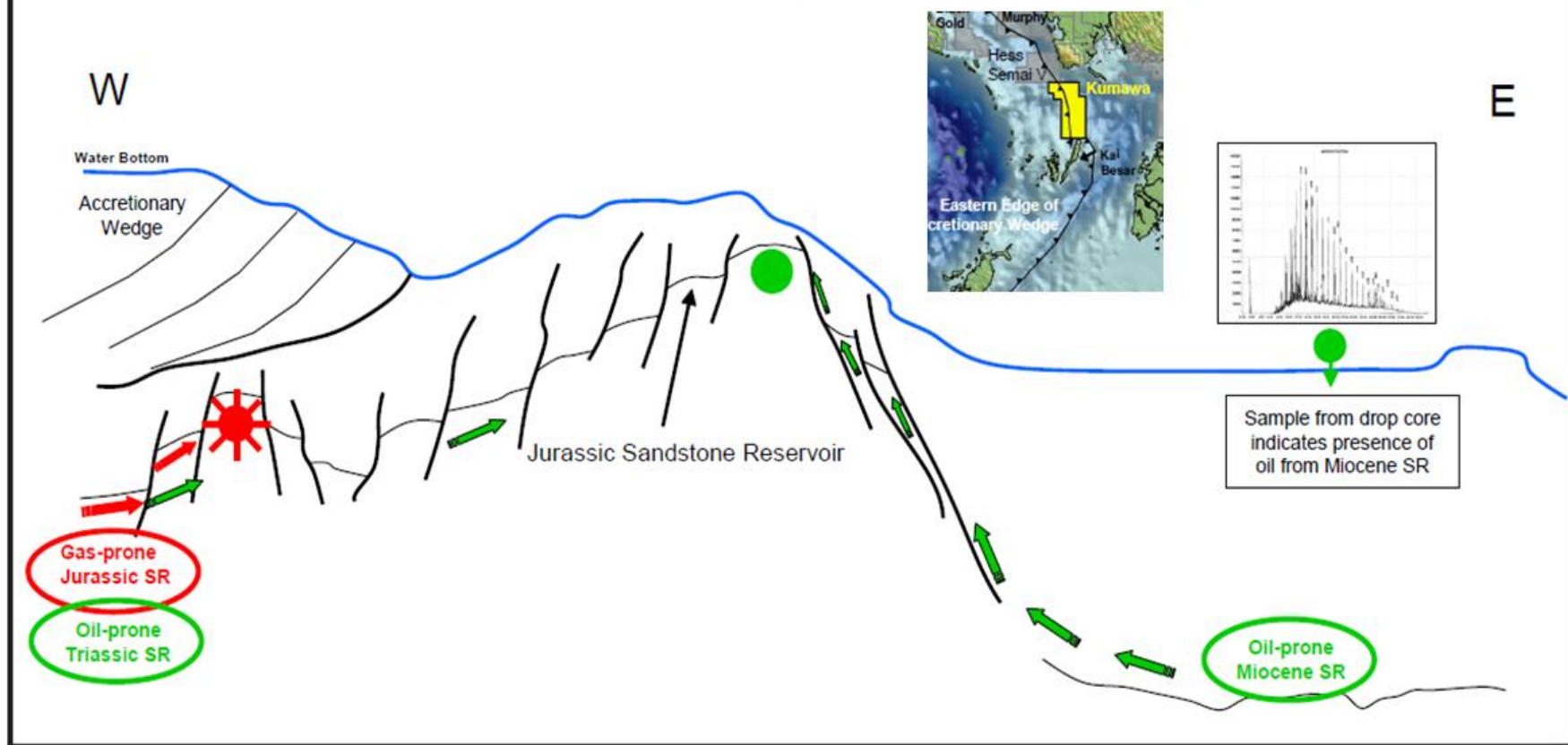


Figure 2. Marathon's play concept for the Kumawa Block (which is adjacent to our 2013 survey area). Migration from the Miocene illustrated on the RHS.



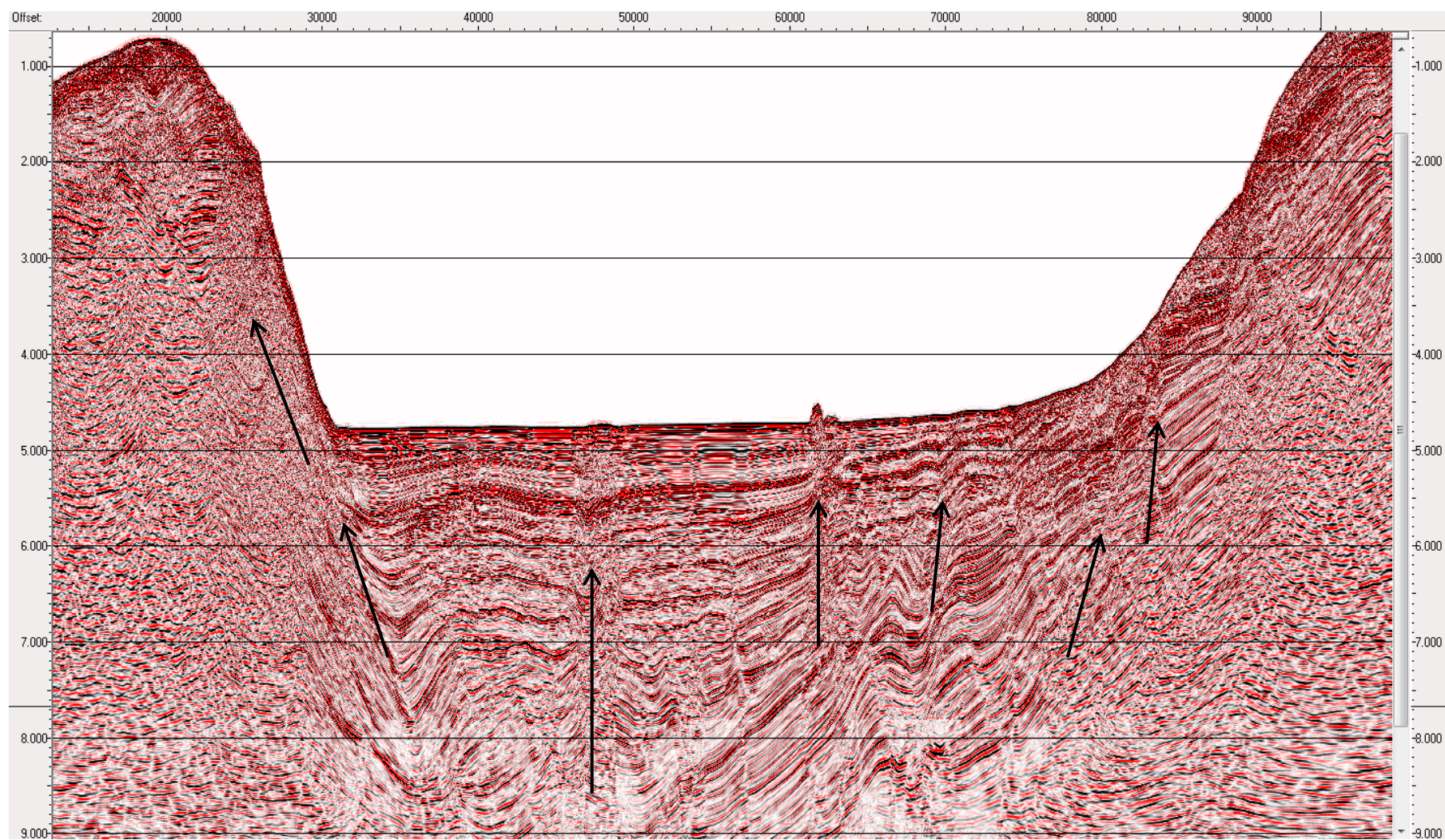


Figure 3. A West-East seismic section across the Aru Trough. Section width approx 90 km. Arrows indicate potential hydrocarbon pathways. Further detail can be seen on the zoomed version in [Figure 4](#).



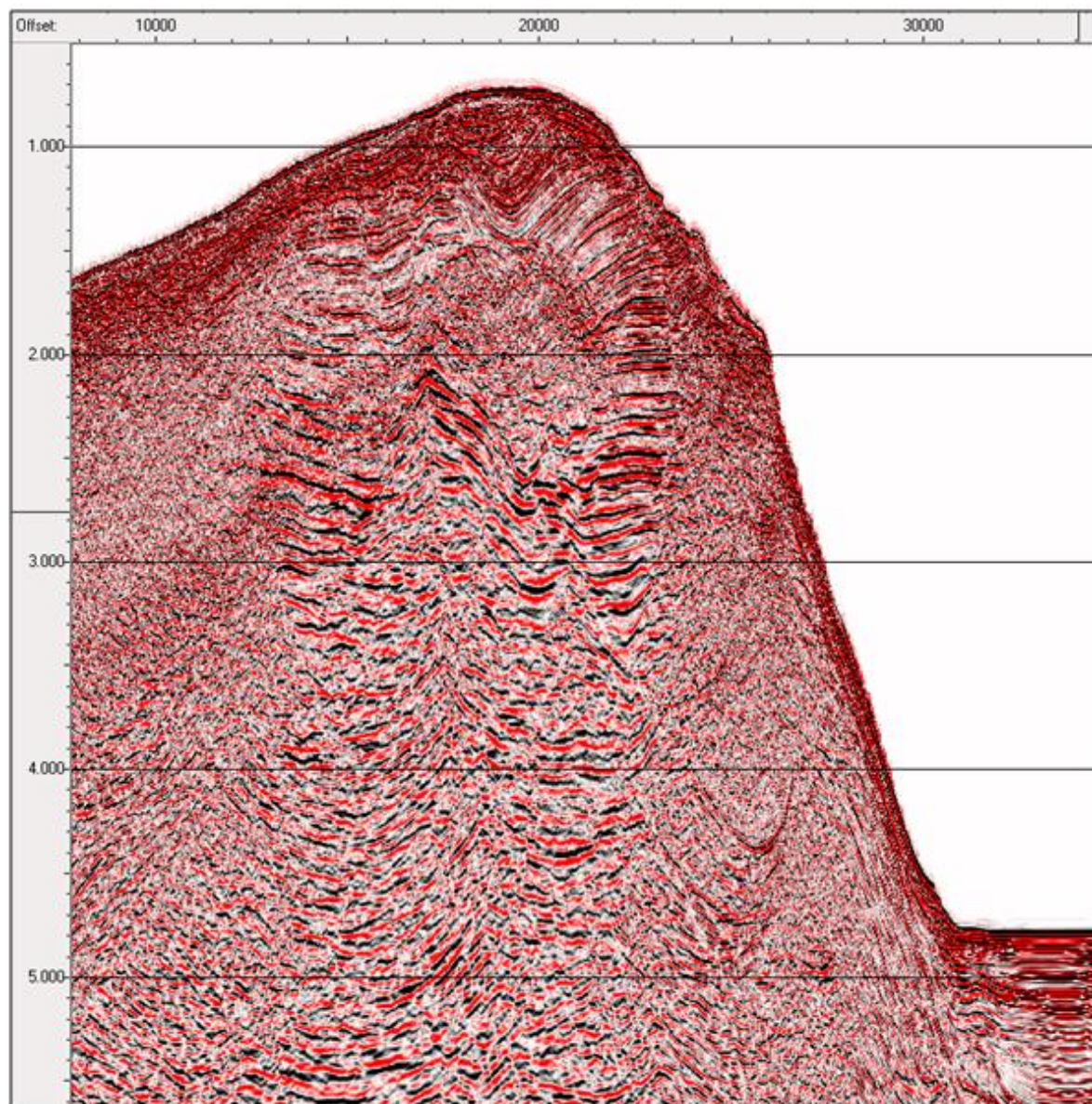


Figure 4. Zoomed version of the LHS of [Figure 3](#) showing the offshore bathymetric high (here named the East Kai Ridge) in more detail. Minimum water depth approx 500m. Section width = 27 km.



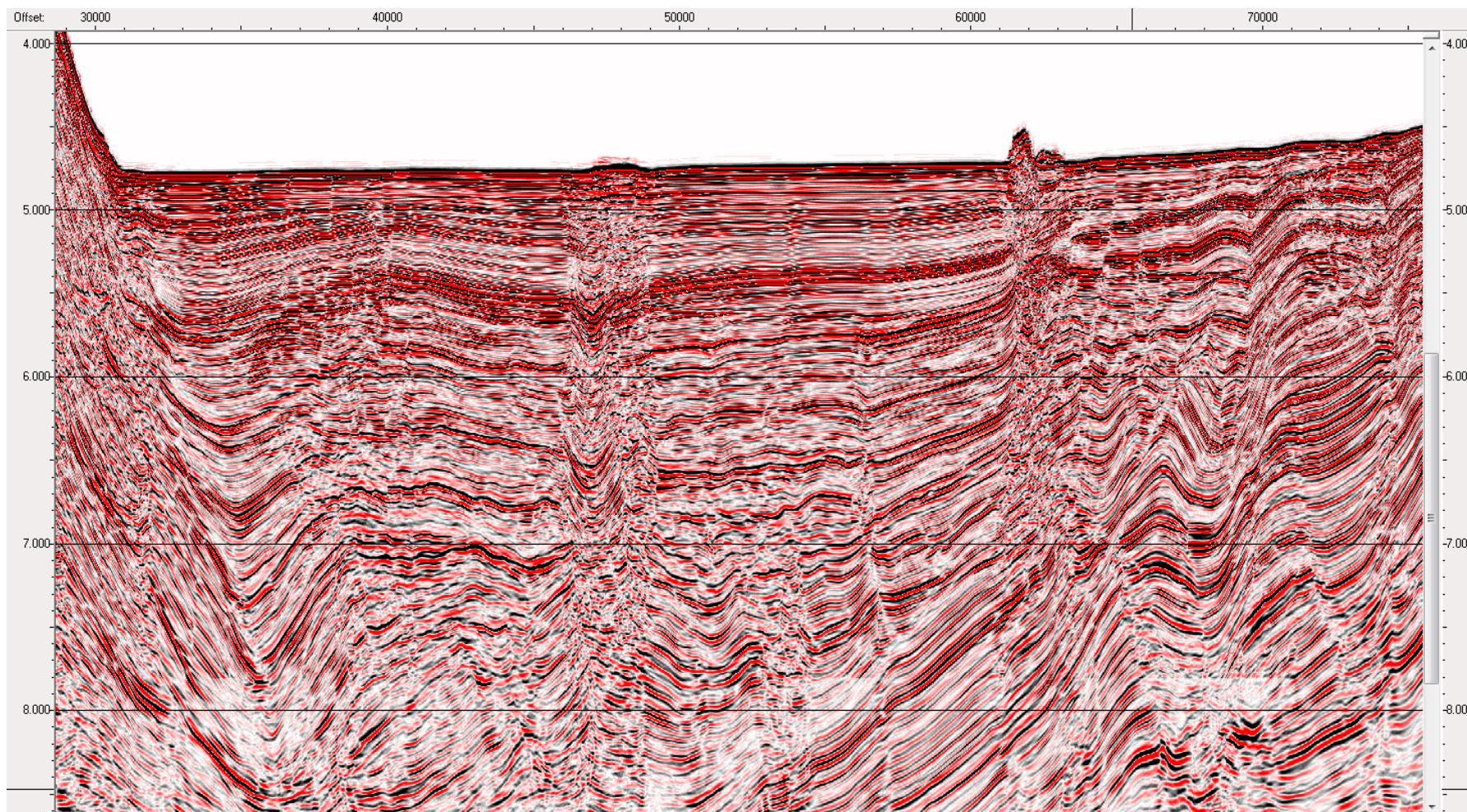


Figure 5. Zoomed in version of [Figure 3](#). Features on the sea floor could be chemosynthetic communities associated with hydrocarbon seepage. Section width approximately 50 km.



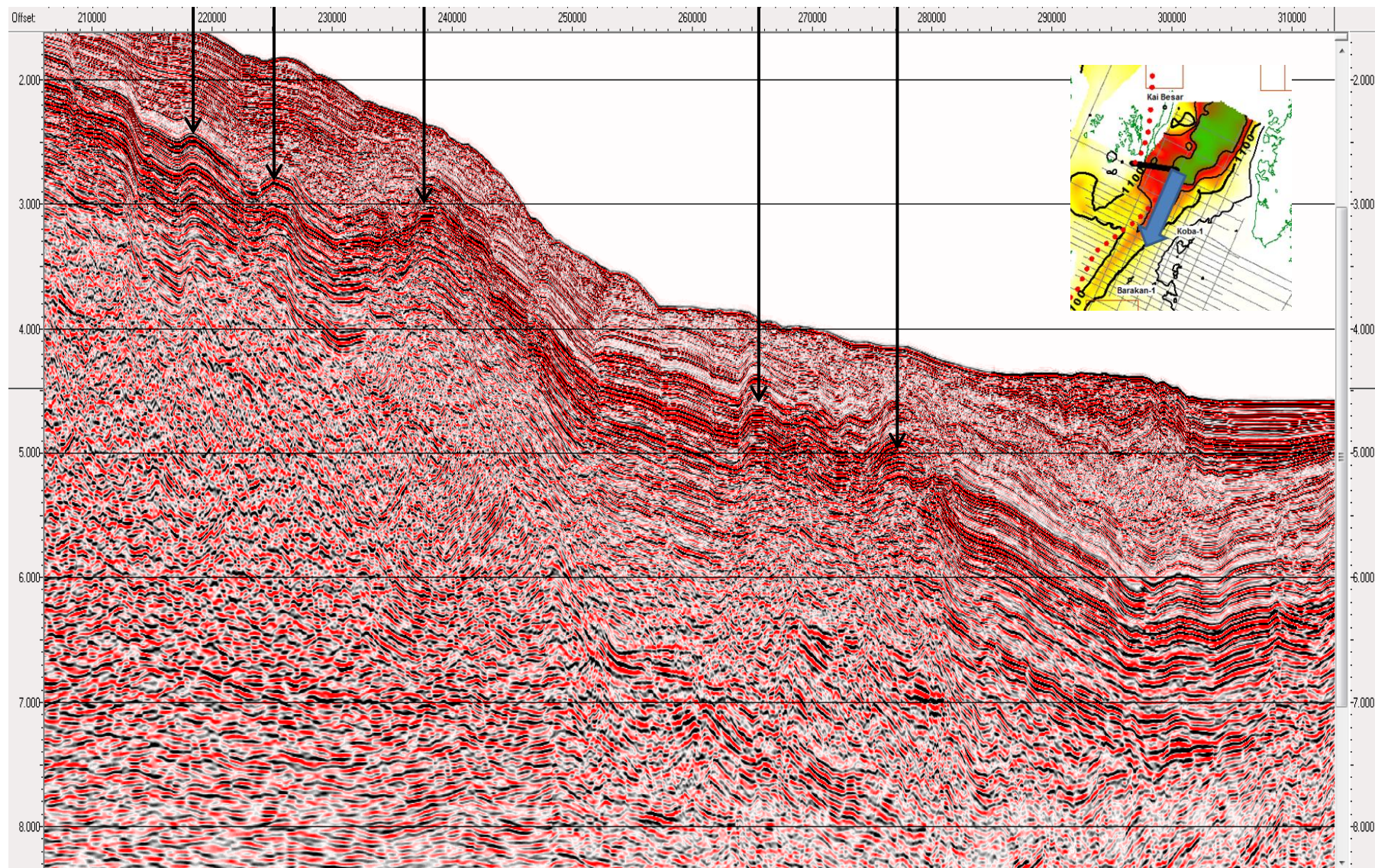


Figure 6. South – North seismic line. Arrows indicate structures into which hydrocarbons migrating from the Trough could be trapped in. Section width approx 100 kms. Bathymetric map inset.