

**PS Carbonate Microfacies as a Source Rock:
Heat Flow and Carbonate Source Rock Modeling of Kais Formation, Indonesia***

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Abstract

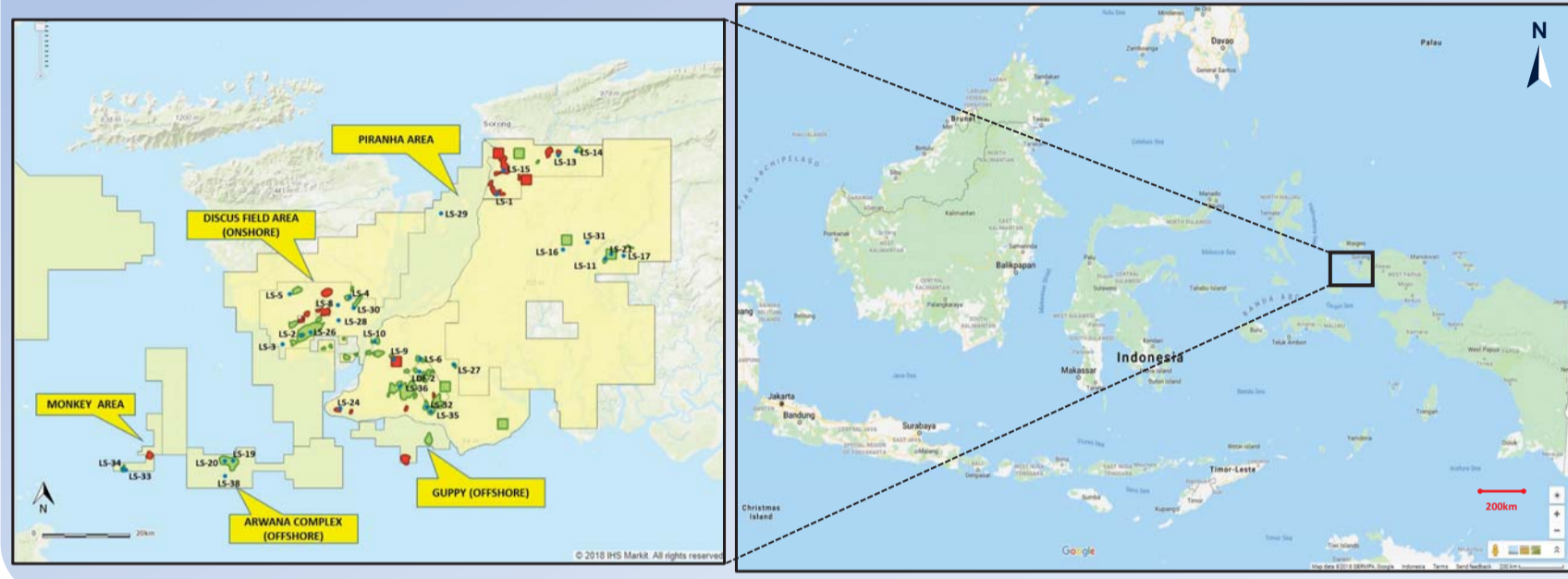
The study area is located in the Salawati Basin, Indonesia. We present Heat Flow combined with biomarker analysis to get a source rock maturity map for the Kais Formation carbonate microfacies, which is known as a productive reservoir. Part of the Kais Formation consists of carbonate rock, and is rarely considered an internal source rock. The microfacies of the Kais Formation has controlled the maturity of source rock. Multi-cluster analysis, carbonate microfacies typing, and facies seismic characterization are conducted to obtain facies classification and environmental deposition. Biomarker evaluation and frame-to-gram m/z, focused on the Klamono Block, showed a biodegradation phase and origins of the hydrocarbons. We conducted 1D burial history analysis to obtain basin evolution and 3D burial history for modeling source rock maturation. History of submergence on the onshore area (Kawista-1) indicates the maturity of the Kais Formation as a source rock begins in Early Miocene and reaches 0.9 % Ro at the bottom. The Kais Formation achieves ideal maturity in the area of the research block, maturity ranges from 0.55 to 1.3% Ro in the north, and maturity rises towards the northwest.

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This poster presents heat flow combined with biomarker analysis, aiming to yield source rock maturity map from Kais Formation carbonate microfacies, which is known as a productive reservoir. Part of Kais Formation which consists of carbonate rock, rarely considered as an internal source rock. The microfacies of Kais Formation has

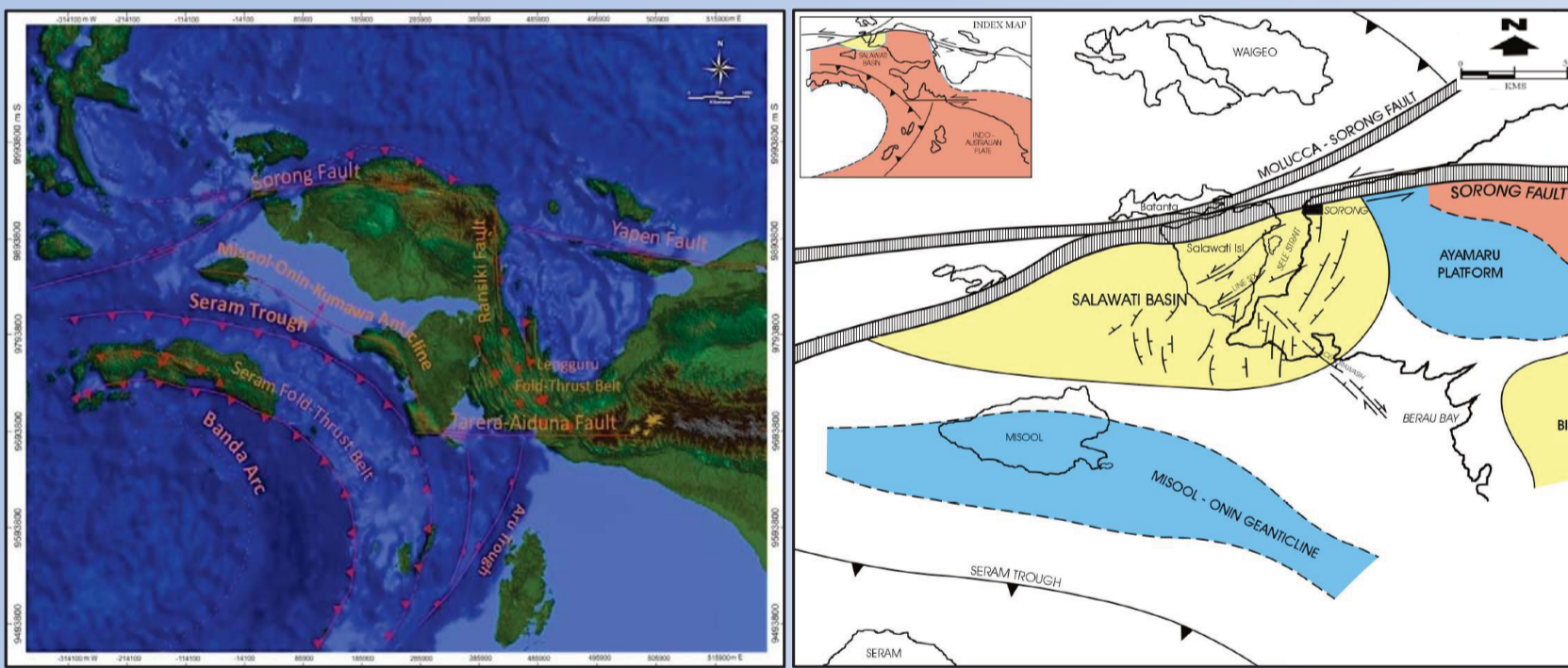
controlled the maturity of source rock. The study area is located at the eastern part of Indonesia, specifically at Salawati Basin, eastern part of Bird Head, western part of West Papua and southern part of Salawati Island. The study area covered several active oil and gas field such as Discus Field (onshore), Monkey Field (offshore), and Arwana Field (offshore).

RESEARCH LOCATION

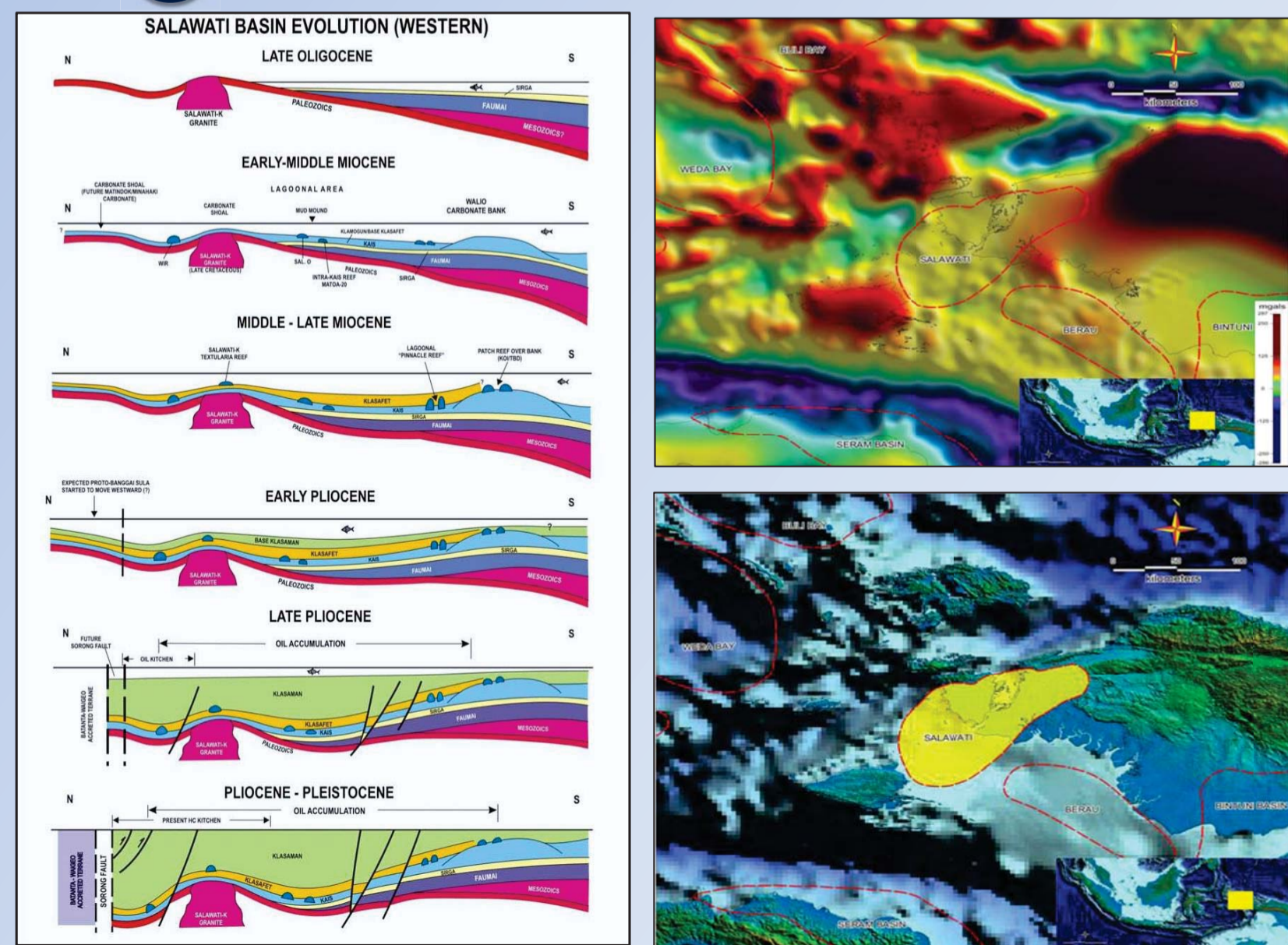


REGIONAL GEOLOGY

TECTONIC SETTING

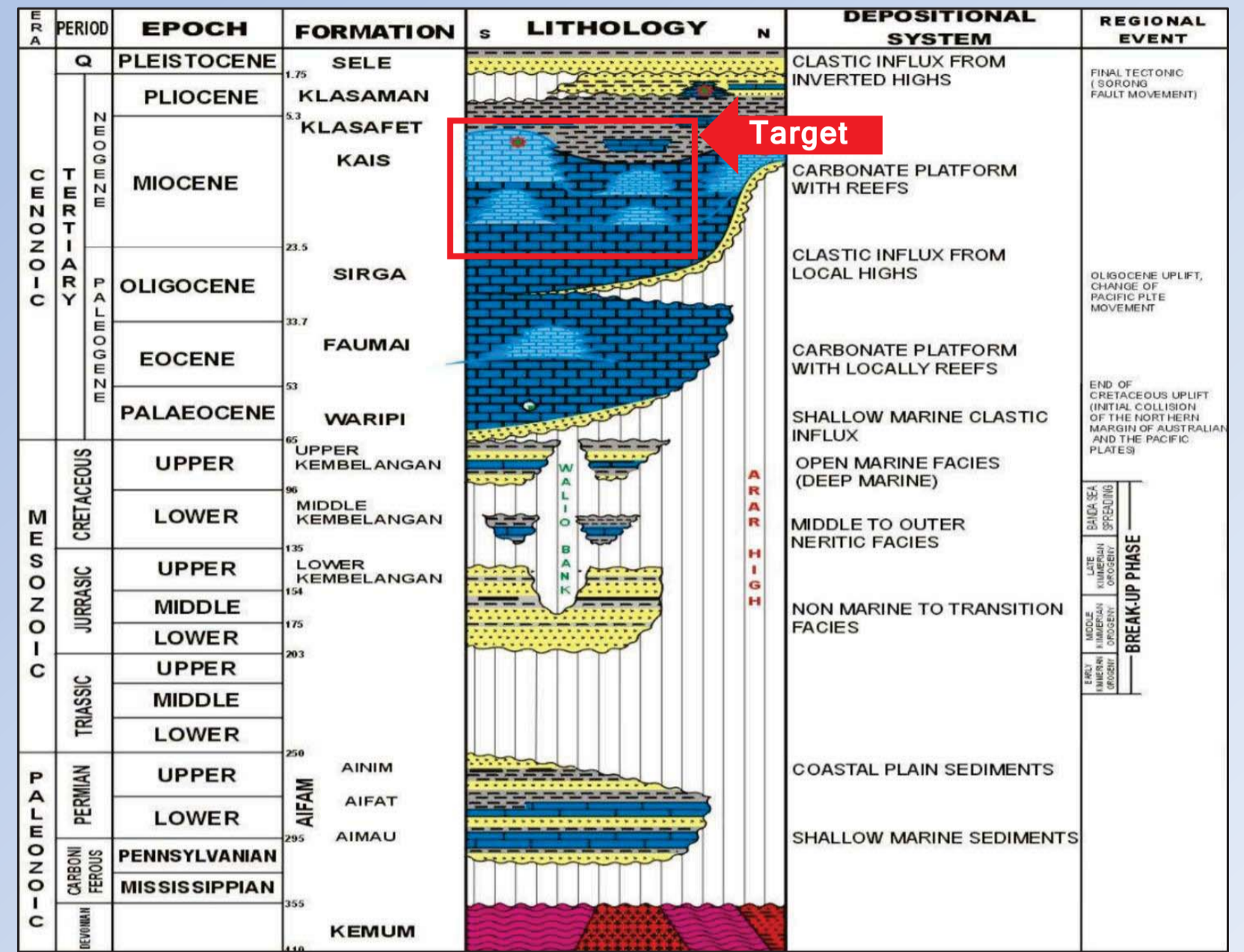


BASIN CONFIGURATION

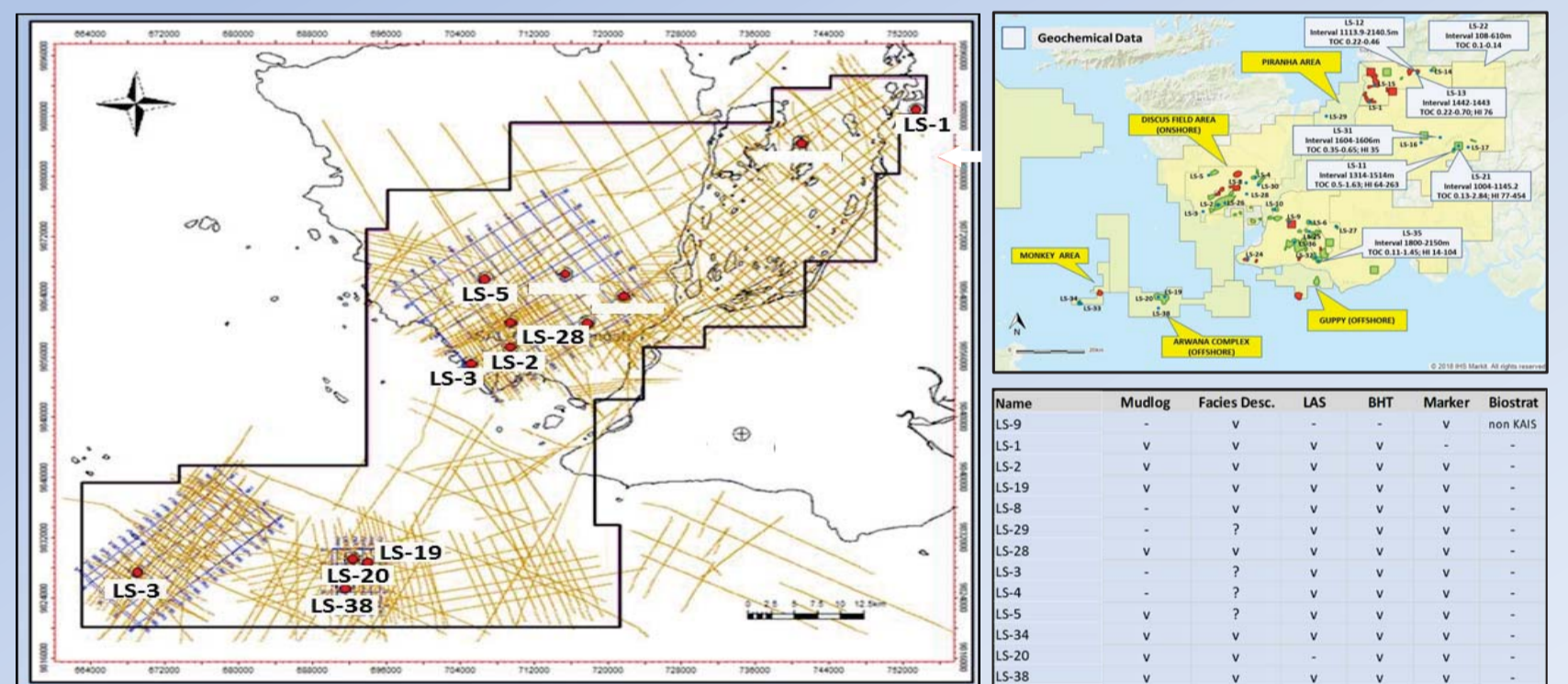


REGIONAL GEOLOGY

REGIONAL STRATIGRAPHY



DATA



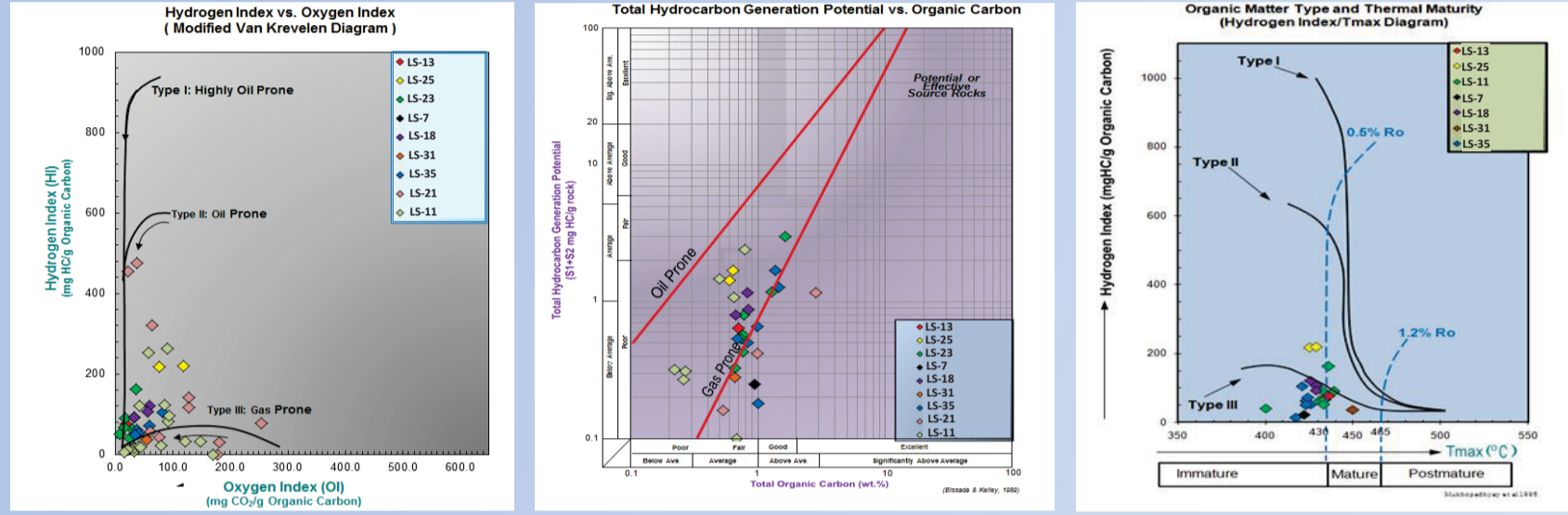
METHOD AND ANALYSIS



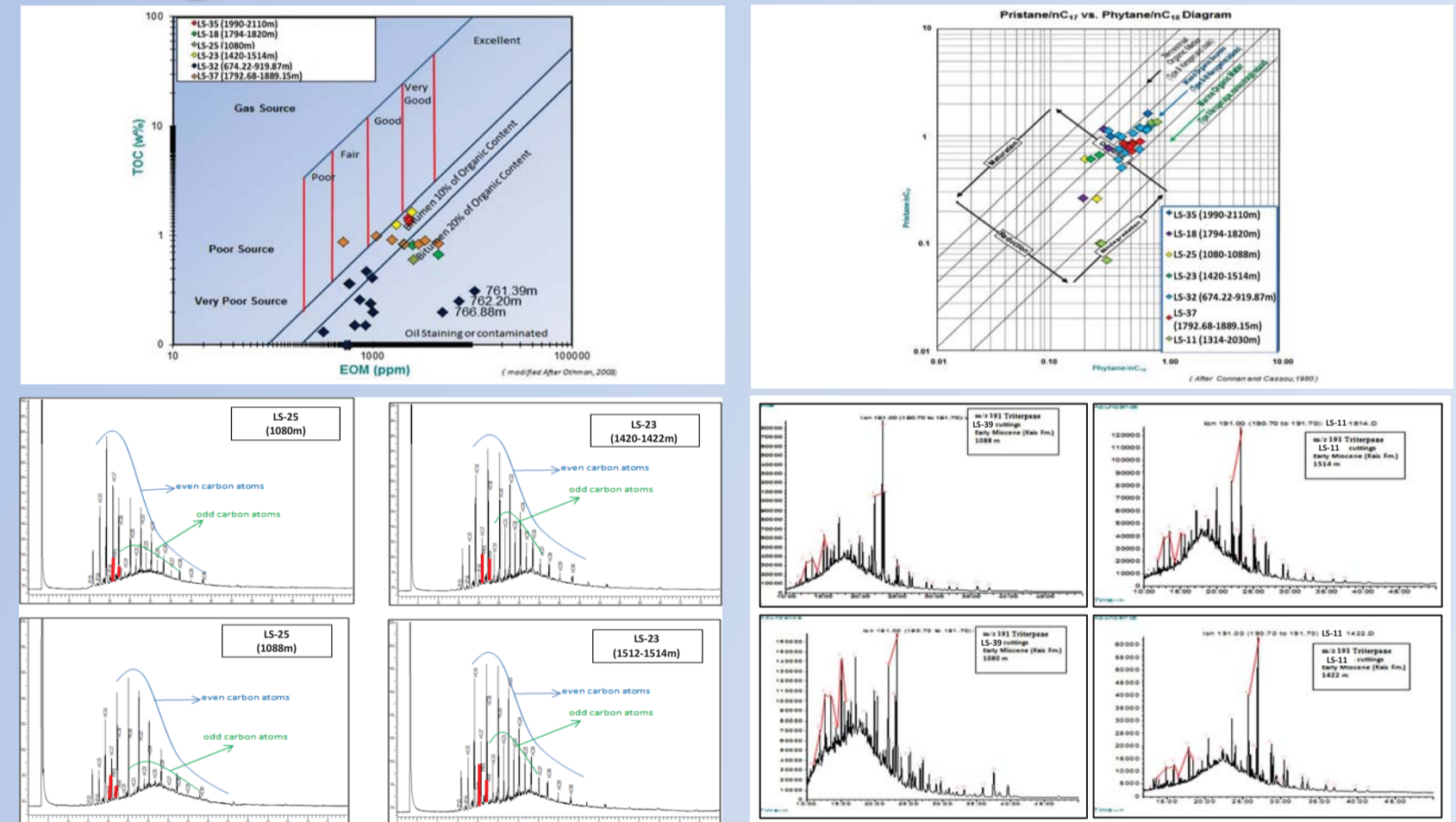
METHOD AND ANALYSIS

SOURCE ROCK POTENTIAL

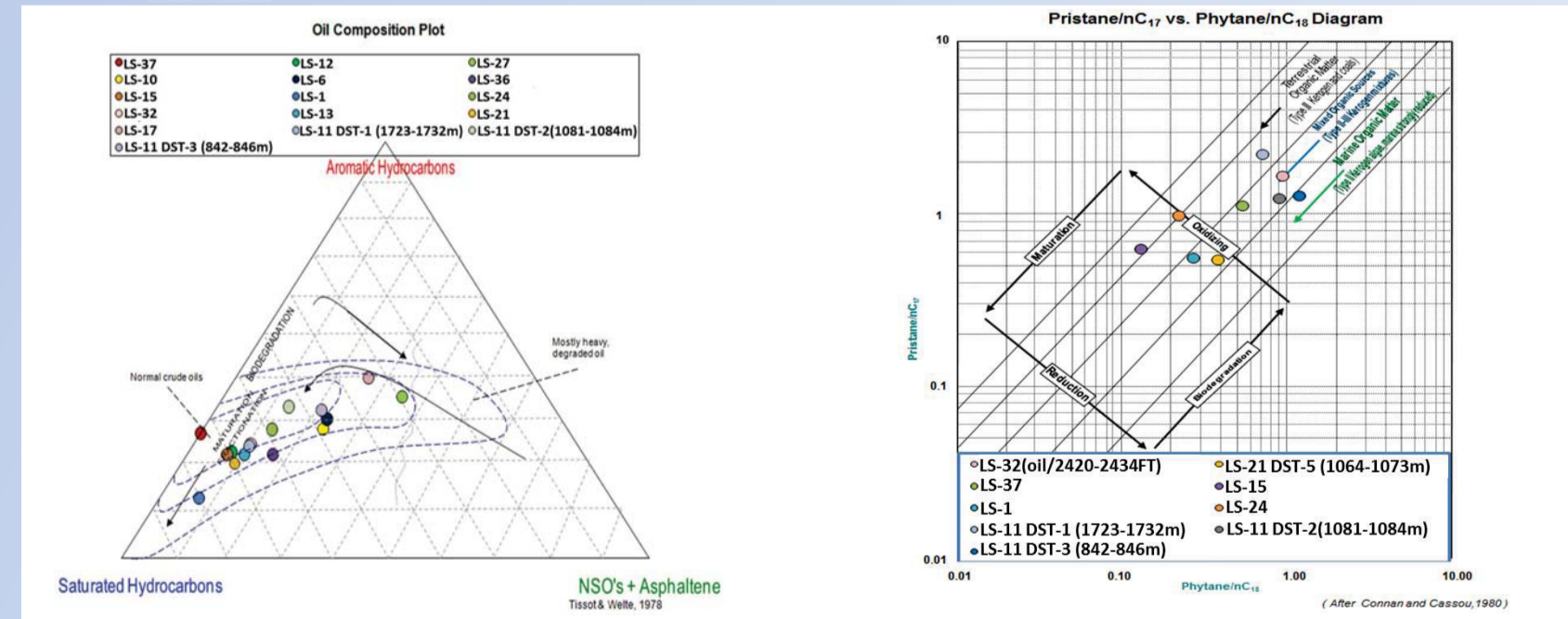
Well name	Sample Type	Sample ID	Depth (m)	Lithology	Age	Formation	Whole Rock Reference (Ro, under 0.2 bar)	T _{max} (°C)	Hydrogen Index (mg HC/g OC)	Pyrolytic Hydrogen Index (mg HC/g OC)	Pyrolytic Organic Index (mg HC/g OC)	Pyrolytic Sulfur Index (mg S/g OC)	Pyrolytic Nitrogen Index (mg N/g OC)	Pyrolytic Phosphorus Index (mg P/g OC)	Pyrolytic Potassium Index (mg K/g OC)	Well name	Sample Type	Sample ID	Depth (m)	Lithology	Age	Formation	Whole Rock Reference (Ro, under 0.2 bar)	T _{max} (°C)	Hydrogen Index (mg HC/g OC)	Pyrolytic Hydrogen Index (mg HC/g OC)	Pyrolytic Organic Index (mg HC/g OC)	Pyrolytic Sulfur Index (mg S/g OC)	Pyrolytic Nitrogen Index (mg N/g OC)	Pyrolytic Phosphorus Index (mg P/g OC)	Pyrolytic Potassium Index (mg K/g OC)	
LS-22	Core	18	100	shale			1.10	130	100	100	100	100	100	100	100	LS-21	Core	18	100	shale			1.10	130	100	100	100	100	100	100	100	
LS-13	Core	102	100	shale			1.10	130	100	100	100	100	100	100	100	LS-11	Core	102	100	shale			1.10	130	100	100	100	100	100	100	100	
LS-25	Core	102	100	shale			1.10	130	100	100	100	100	100	100	100	LS-11	Core	102	100	shale			1.10	130	100	100	100	100	100	100	100	100
LS-23	Core	102	100	shale			1.10	130	100	100	100	100	100	100	100	LS-11	Core	102	100	shale			1.10	130	100	100	100	100	100	100	100	100



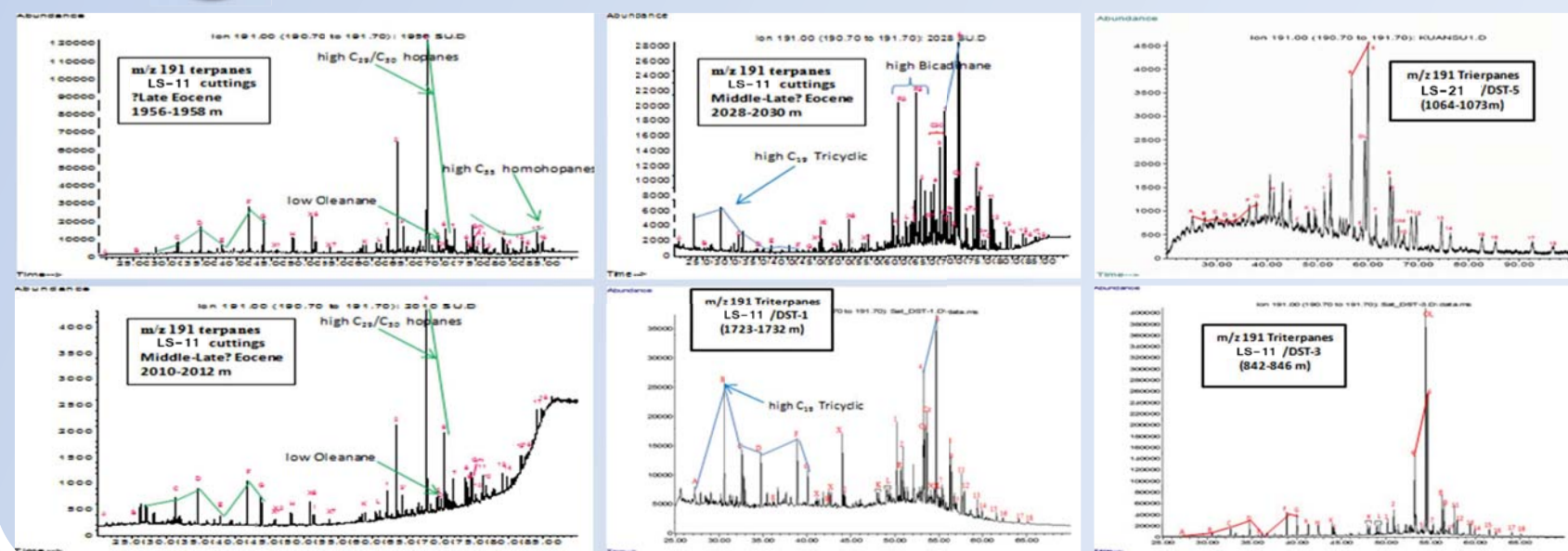
BITUMEN CHARACTERIZATION



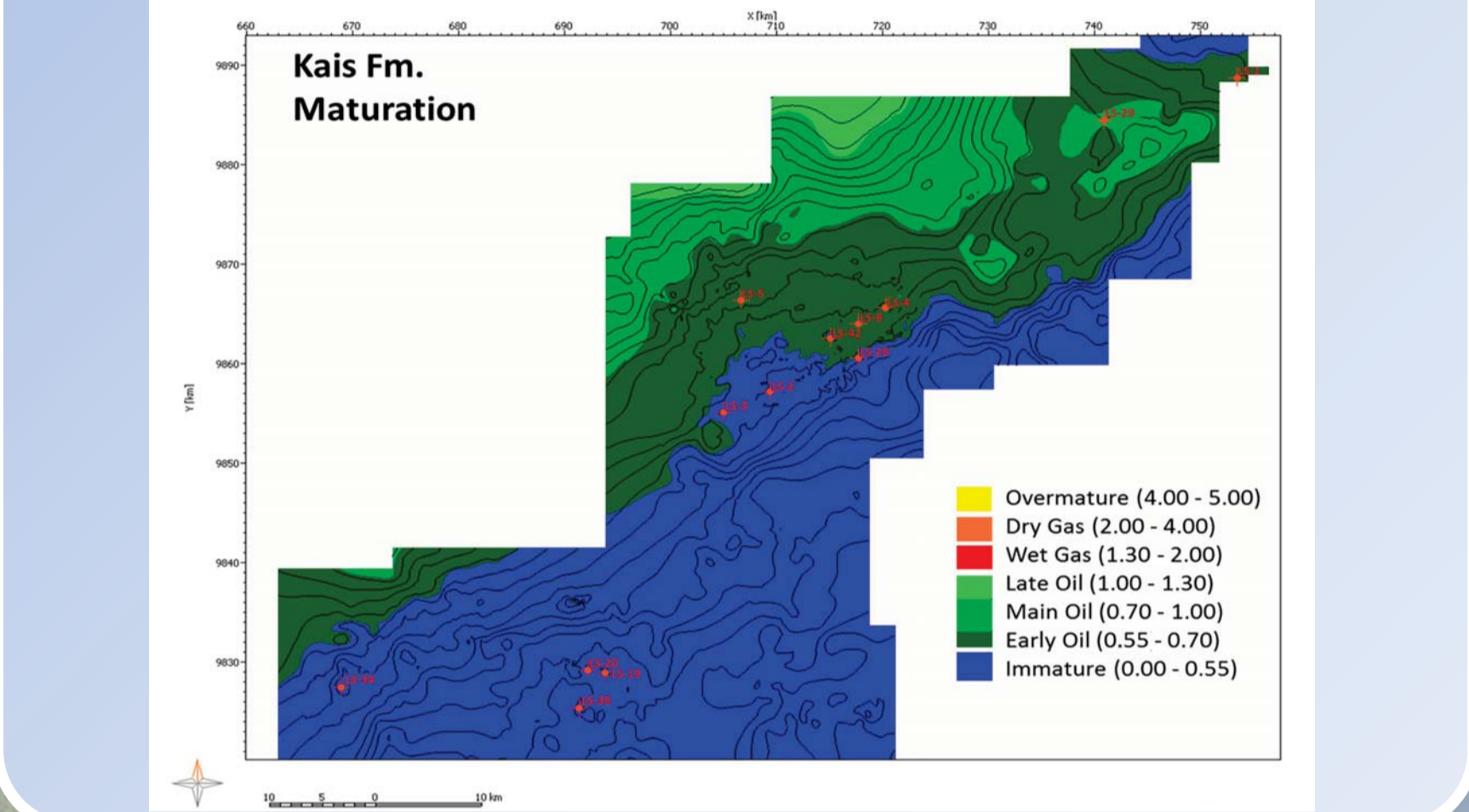
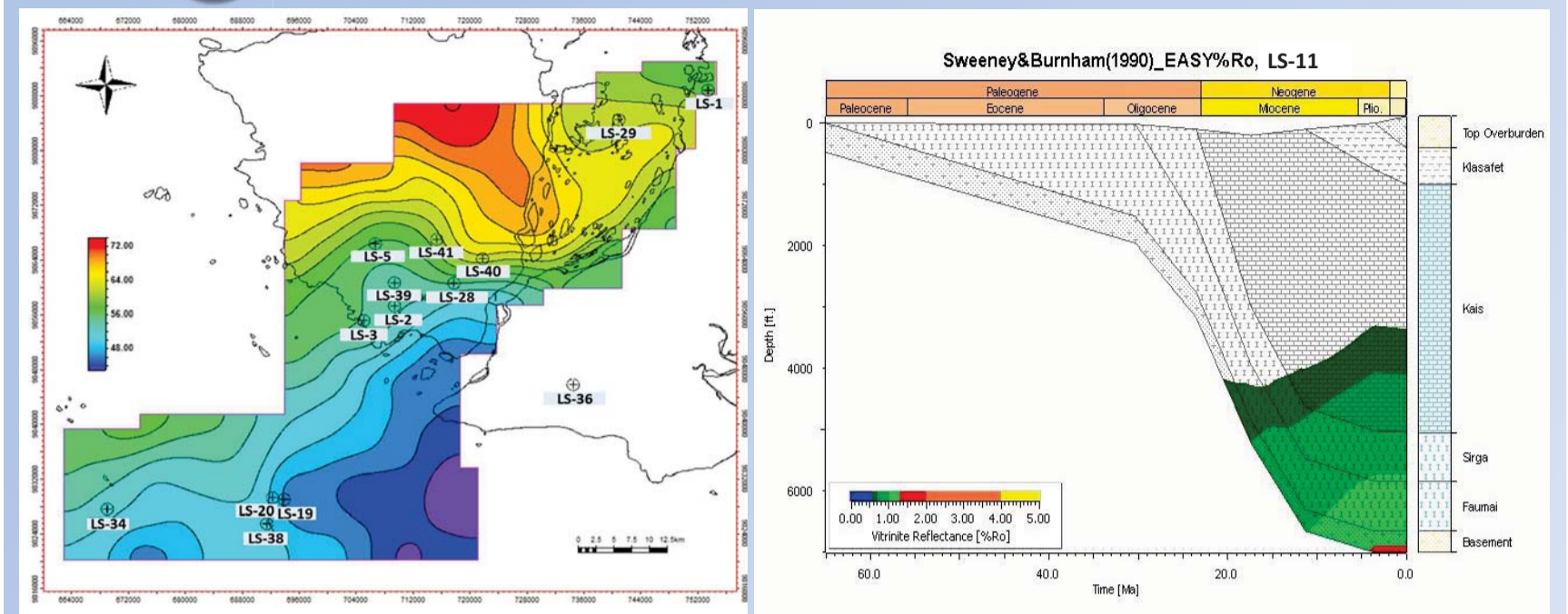
CRUDE OIL CHARACTERIZATION



OIL - SOURCE ROCK CORRELATION



BASIN MODELING



CONCLUSIONS

History of submergence on the onshore area (LS-11) indicates that the maturity of Kais Formation as a source rock begins in Early Miocene and reaches 0.9 % Ro at the bottom. Maturity of Kais Formation in this onshore region reaches only half of Kais thickness, so it is possible that the maturity increases seaward along the direction of basin depocenter during Pliocene. Kais formation as 9a potential carbonate rock) achieves ideal maturity in the area of the research block, maturity ranges from 0.55 to 1.3% Ro in the north, and maturity rises towards the northwest. Southern offshore areas (Monkey

and Arwana field) have a maturity level below 0.55 % Ro. Source rock maturity scenario for Klasafet Formation shows that this interval reaches a maturity of 0.22 - 0.70 % Ro, this maturity is only found in the northwest region of the study block. Source rock maturity scenario for Sirga, Top Faumai, and Lower Faumai formations ranges from 0.55 - 2 % Ro in the north, maturity increases to northwest. The offshore area in the southern part of the block (Monkey and Arwana field) of this formation has maturity ranging from 0.55 to 1.3 % Ro in the western part.

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