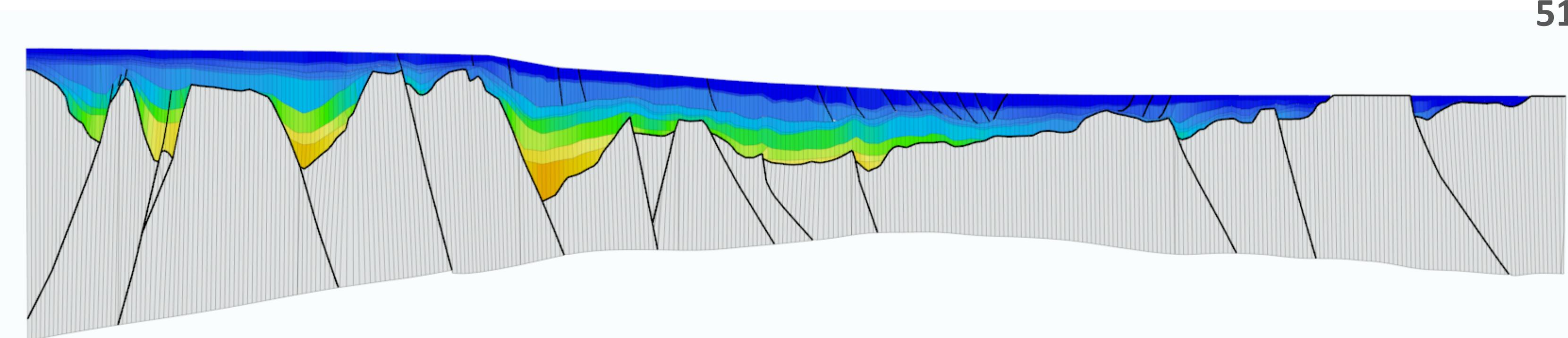




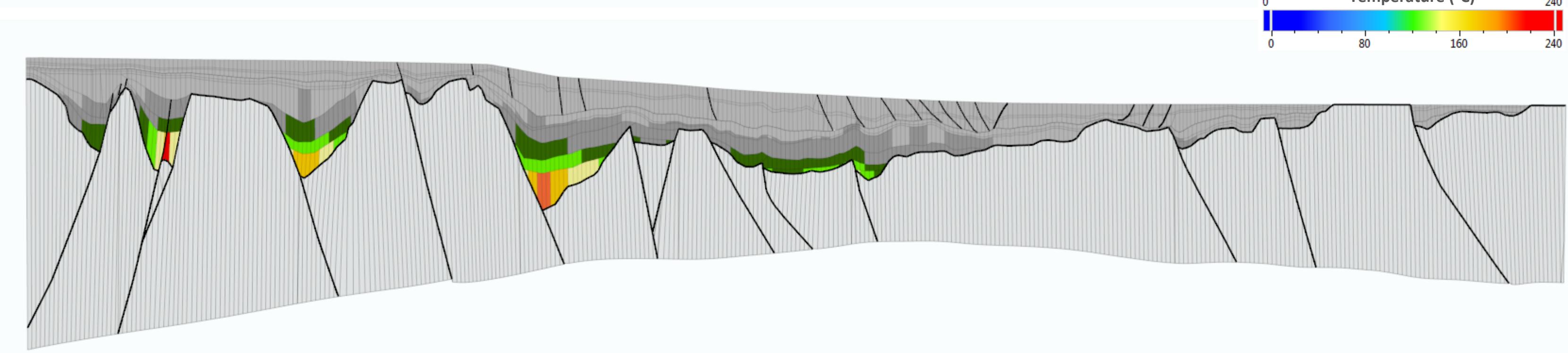
Thermal Regime

TEMPERATURE



51 Ma

VITRINITE REFLECTANCE

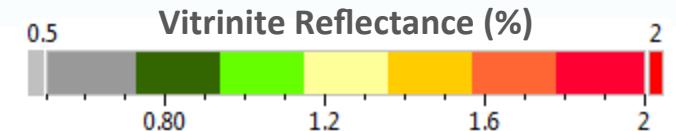


Vertical Exaggeration x4

1

0 25 50 km

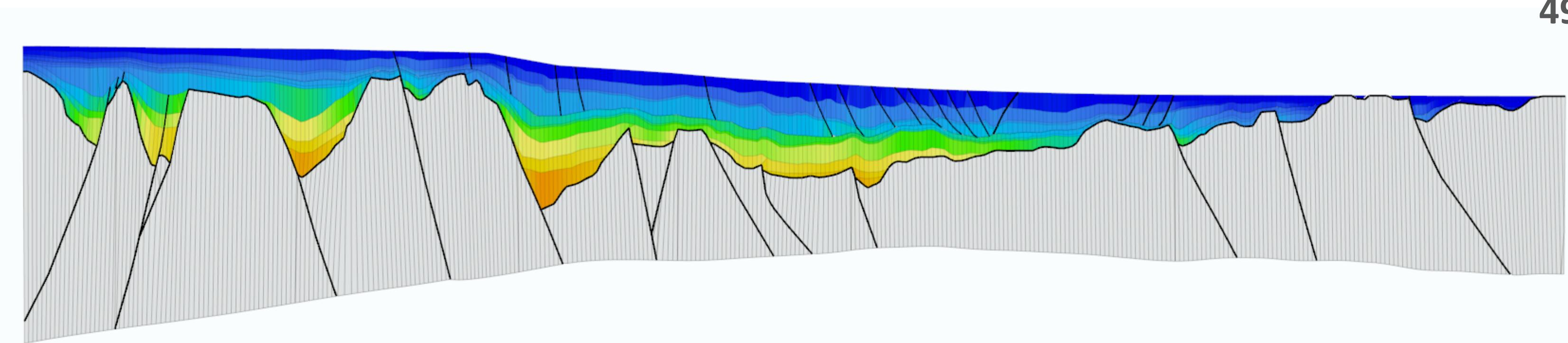
A New Kinematic Tool for PSM in Structurally Complex Margins





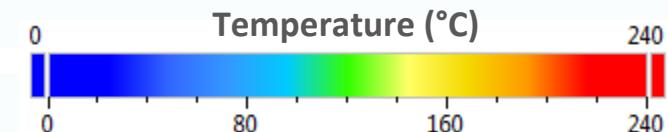
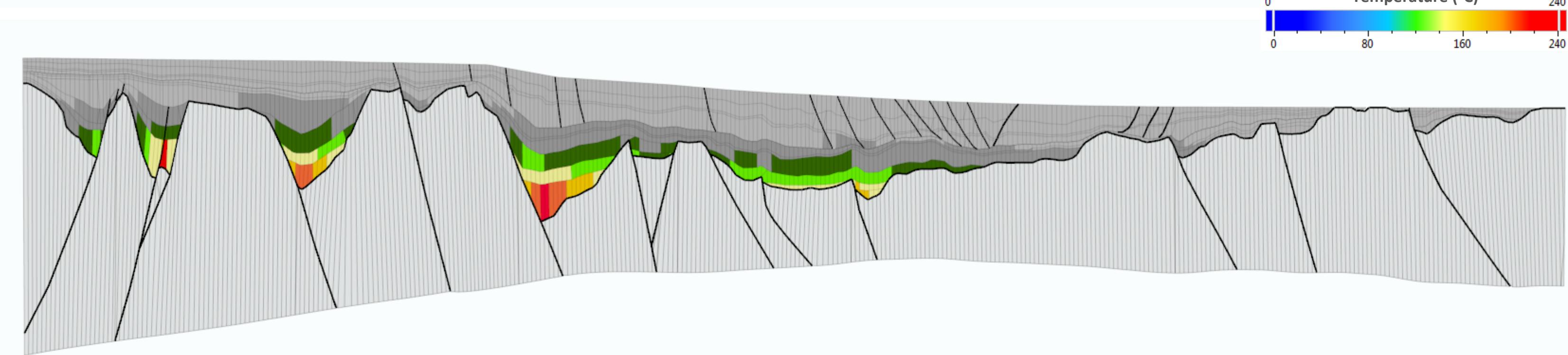
Thermal Regime

TEMPERATURE



49 Ma

VITRINITE REFLECTANCE



Vertical Exaggeration x4

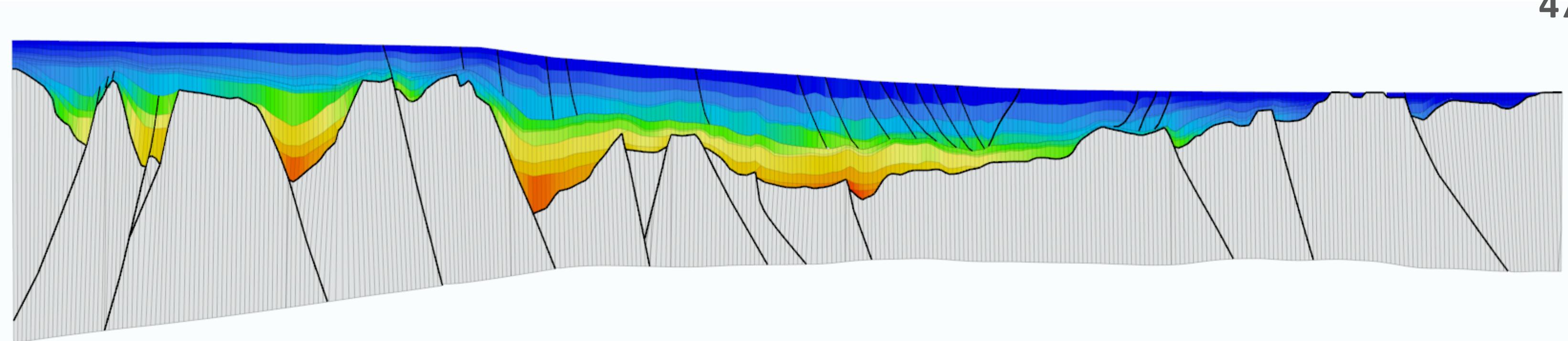




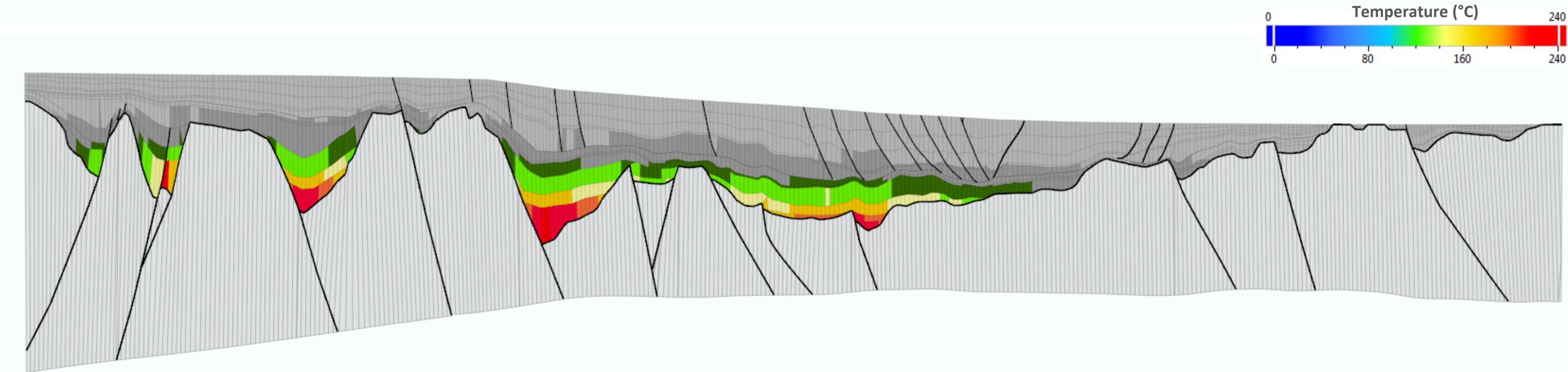
Thermal Regime

47 Ma

TEMPERATURE



VITRINITE REFLECTANCE

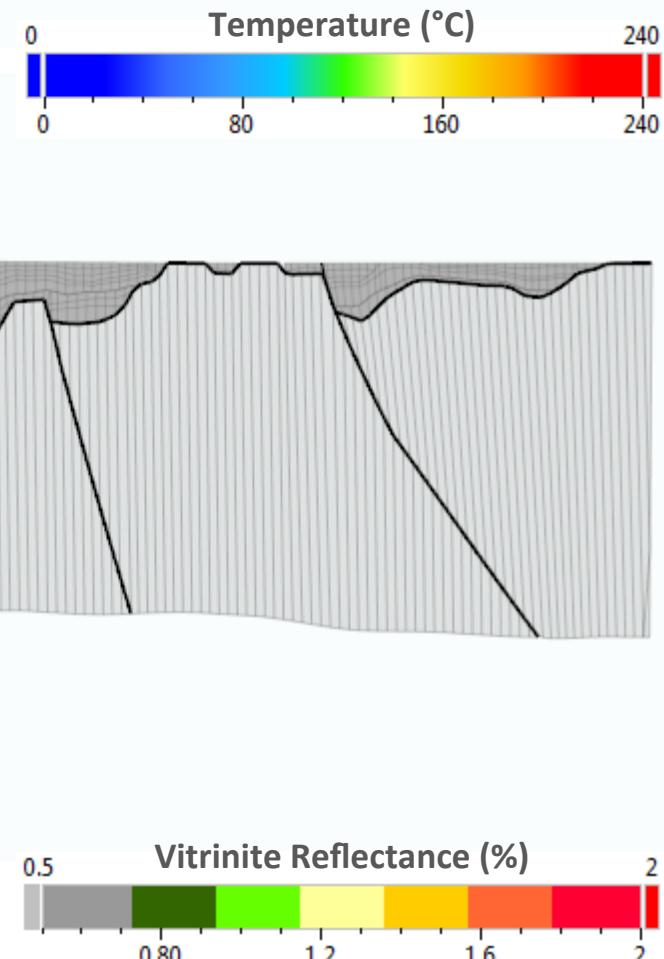


Vertical Exaggeration x4

50 km

3

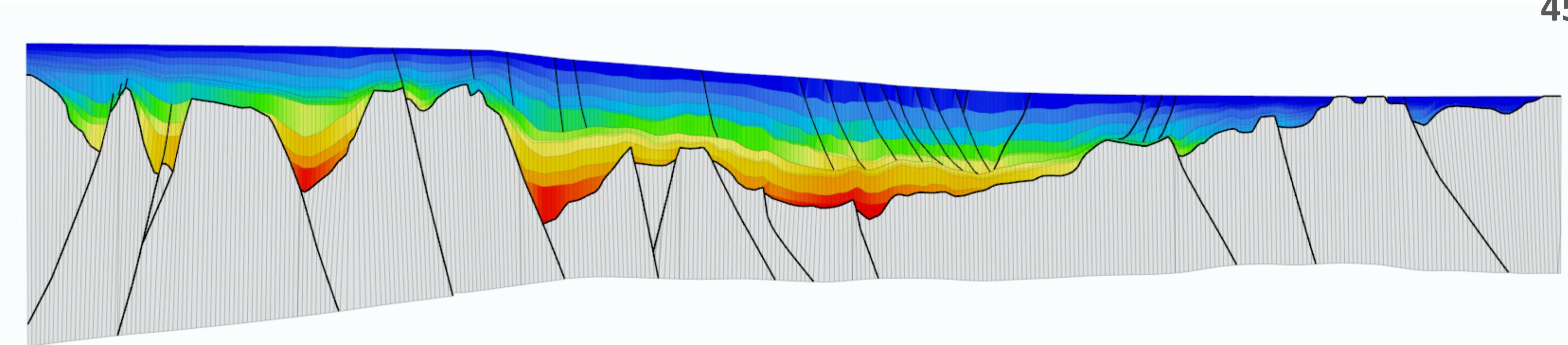
A New Kinematic Tool for PSM in Structurally Complex Margins





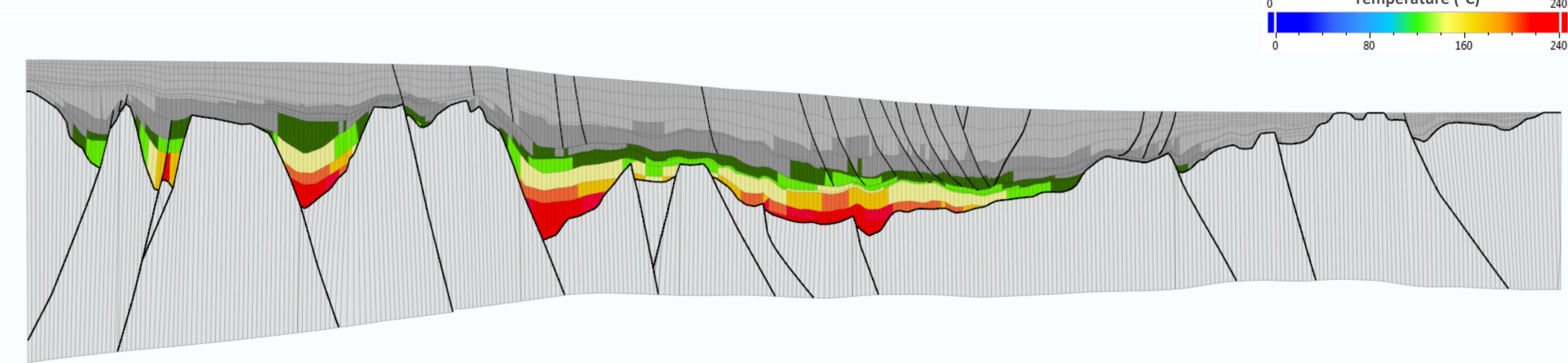
Thermal Regime

TEMPERATURE



45 Ma

VITRINITE REFLECTANCE

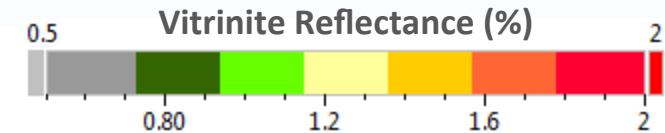


Vertical Exaggeration x4

4

0 25 50 km

A New Kinematic Tool for PSM in Structurally Complex Margins

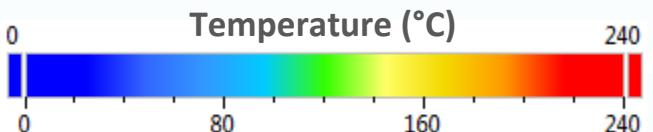
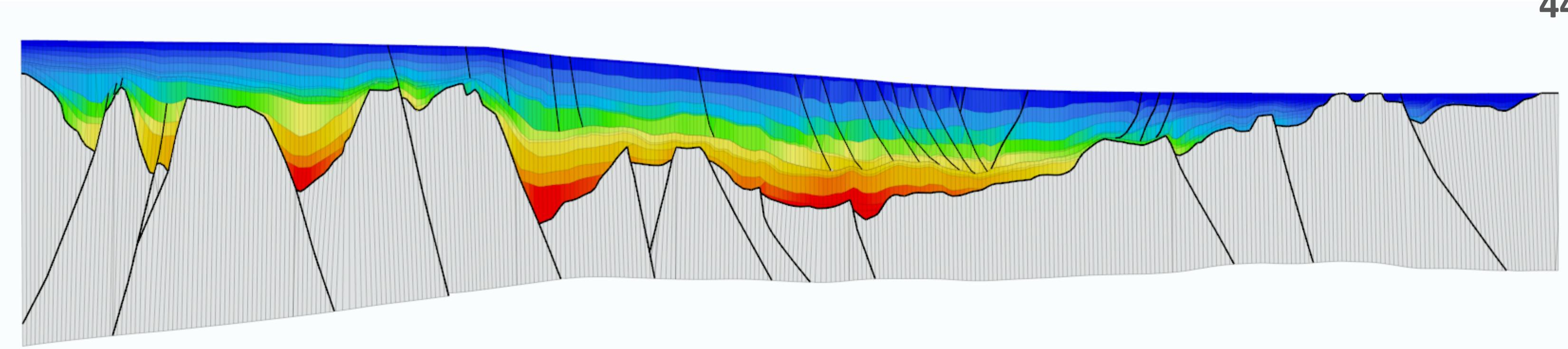




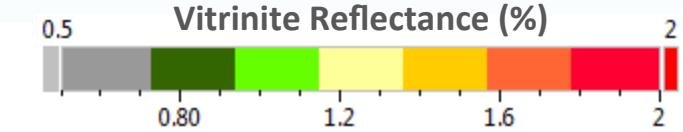
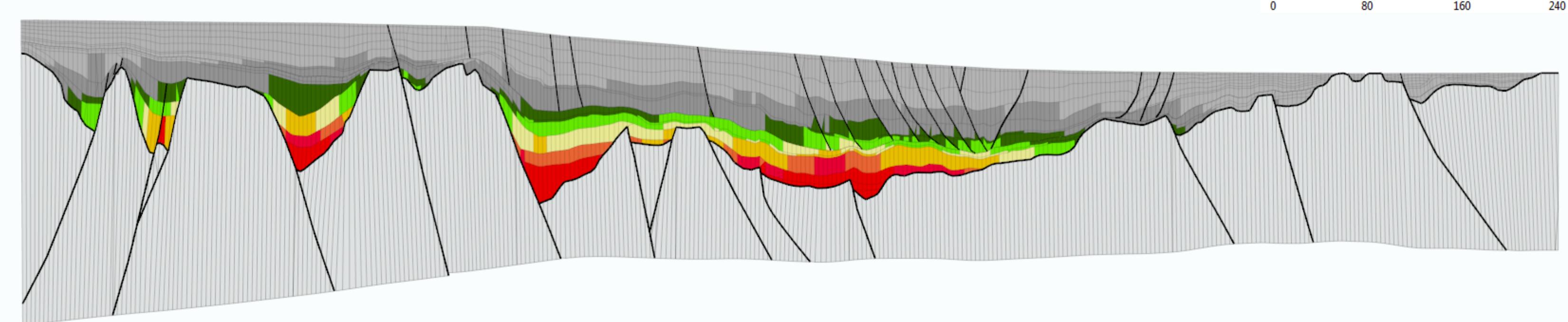
Thermal Regime

44 Ma

TEMPERATURE



VITRINITE REFLECTANCE



Vertical Exaggeration x4

25

50 km

5

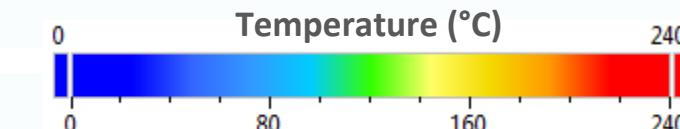
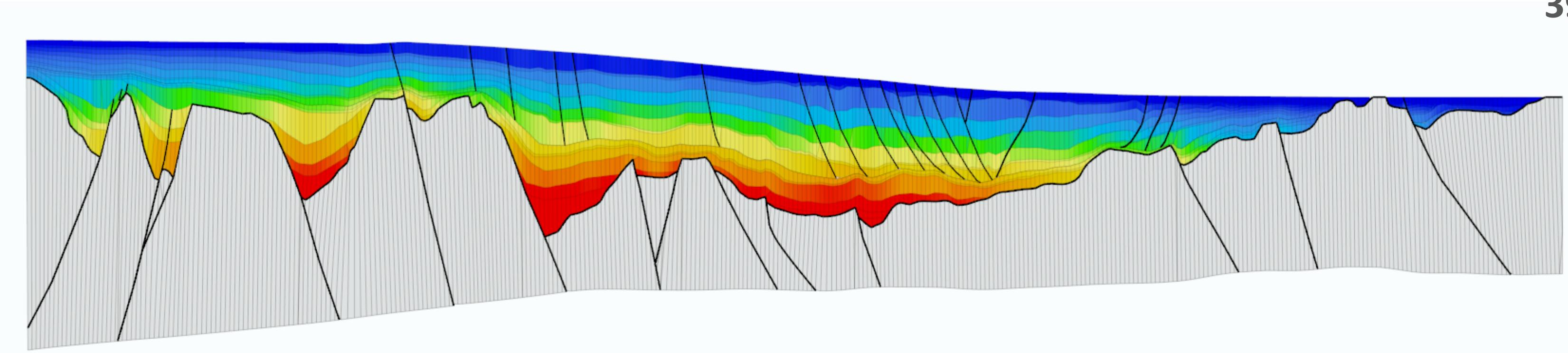
A New Kinematic Tool for PSM in Structurally Complex Margins



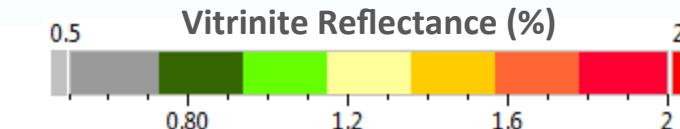
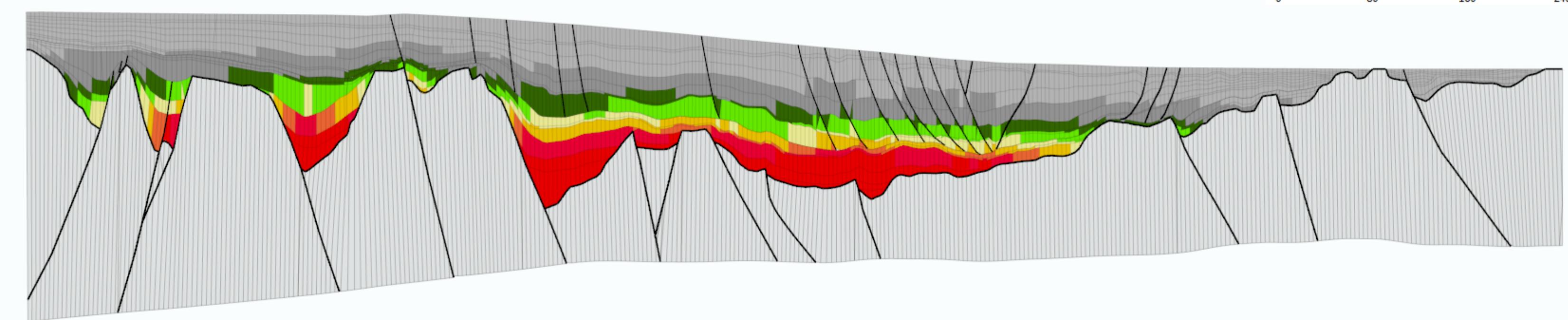
Thermal Regime

39 Ma

TEMPERATURE



VITRINITE REFLECTANCE



Vertical Exaggeration x4

0 25

50 km

6

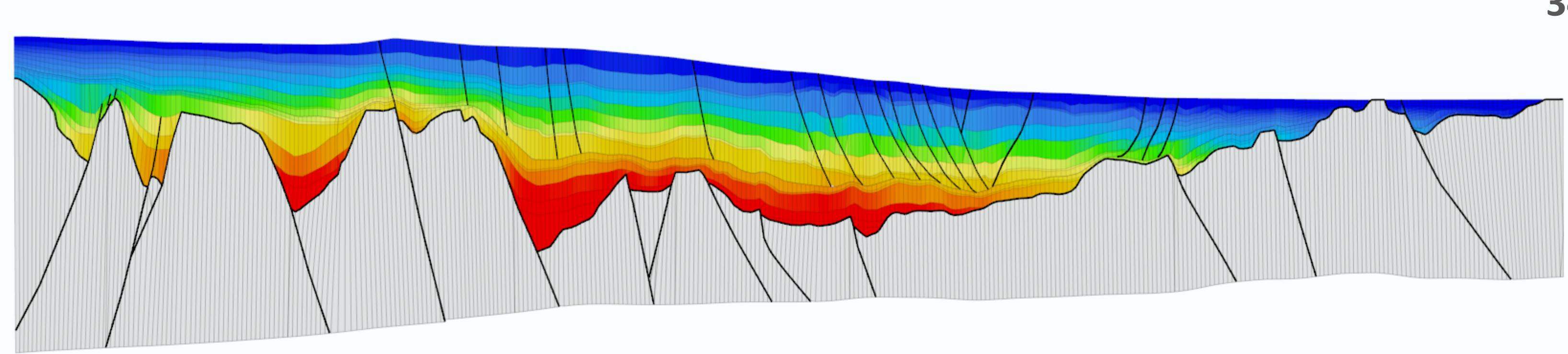
A New Kinematic Tool for PSM in Structurally Complex Margins



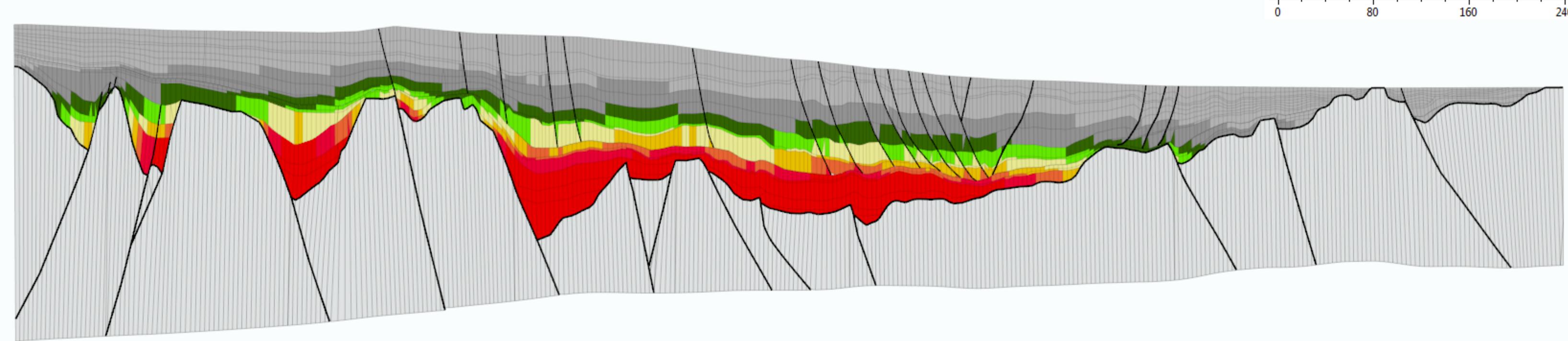
Thermal Regime

34 Ma

TEMPERATURE



VITRINITE REFLECTANCE



Vertical Exaggeration x4

0 25 50 km

7

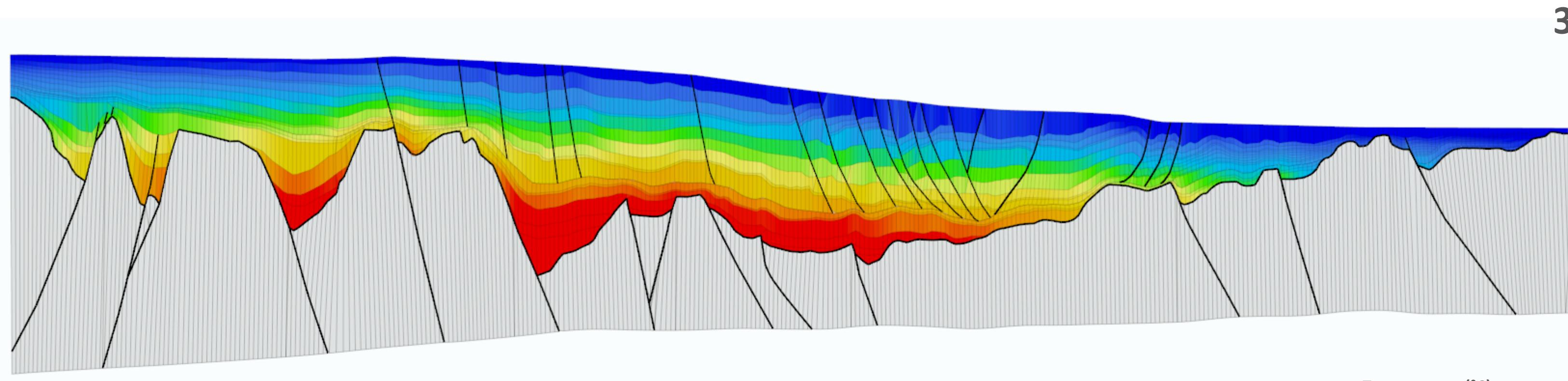
A New Kinematic Tool for PSM in Structurally Complex Margins

0.5 0.80 1.2 1.6 2
Vitrinite Reflectance (%)



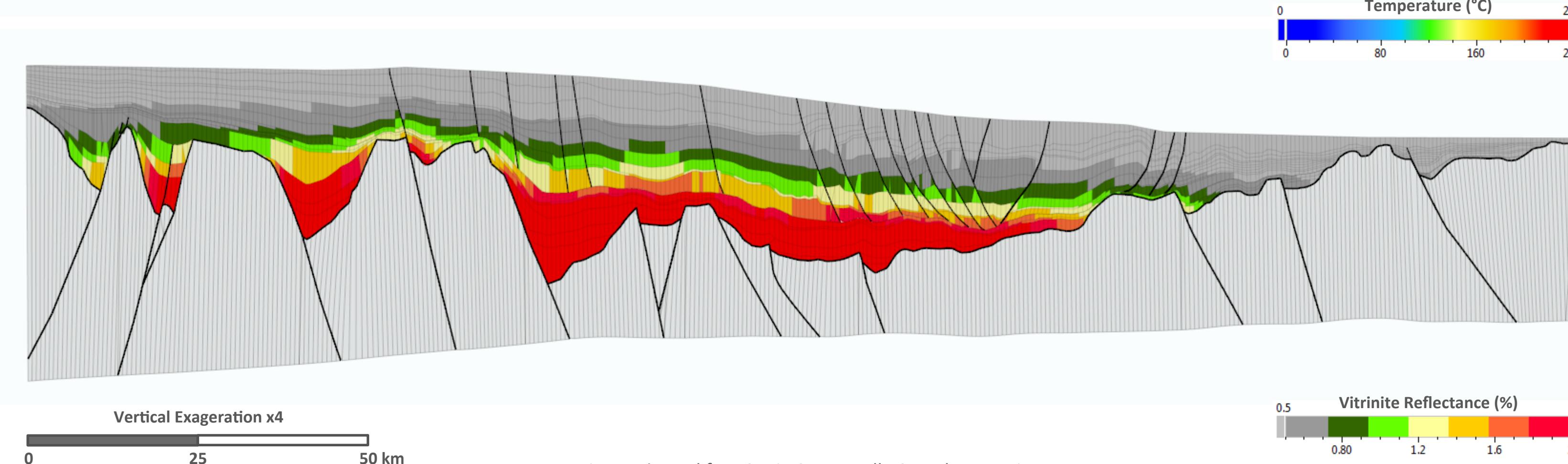
Thermal Regime

TEMPERATURE



30 Ma

VITRINITE REFLECTANCE

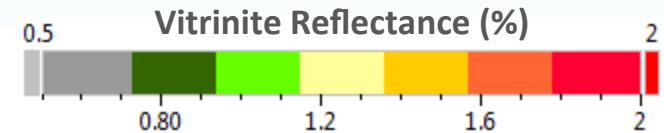


Vertical Exaggeration x4

50 km

8

A New Kinematic Tool for PSM in Structurally Complex Margins

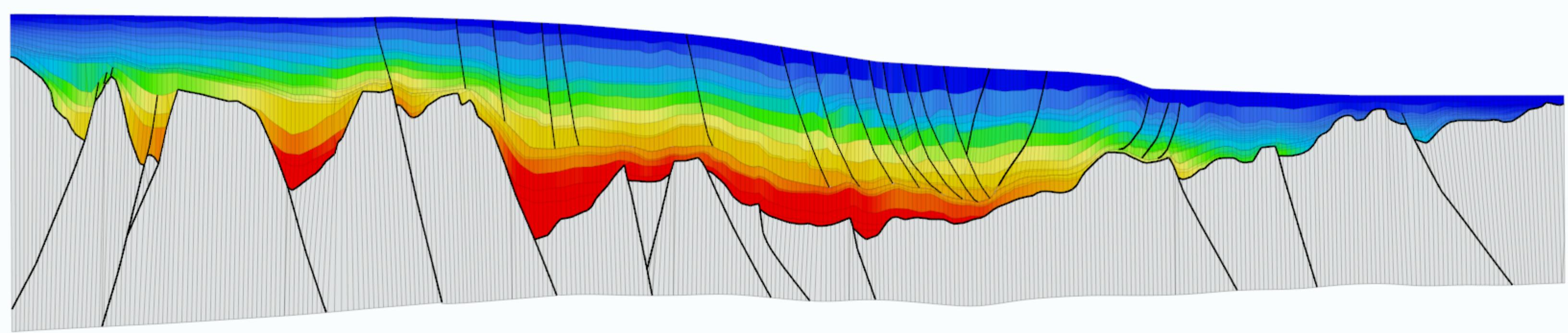




Thermal Regime

27 Ma

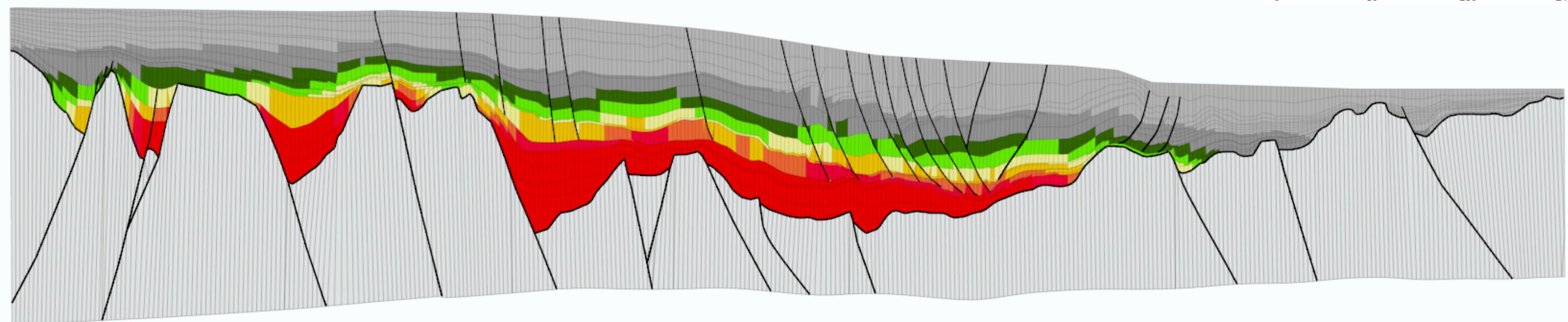
TEMPERATURE



Temperature (°C)

0	240	
0	80	160

VITRINITE REFLECTANCE



Vitrinite Reflectance (%)

0.5	2	
0.80	1.2	1.6

Vertical Exaggeration x4

25

50 km

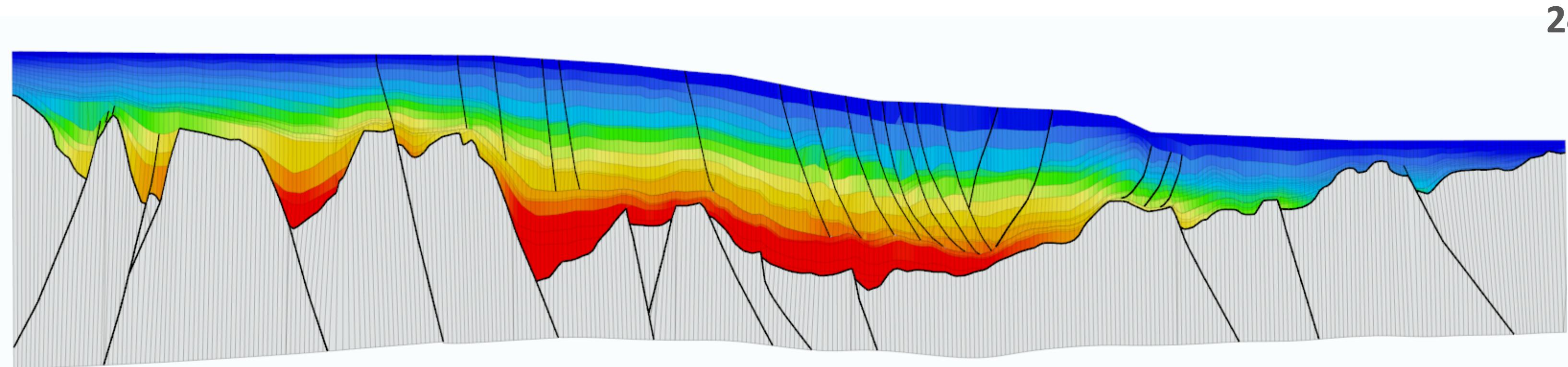
9

A New Kinematic Tool for PSM in Structurally Complex Margins



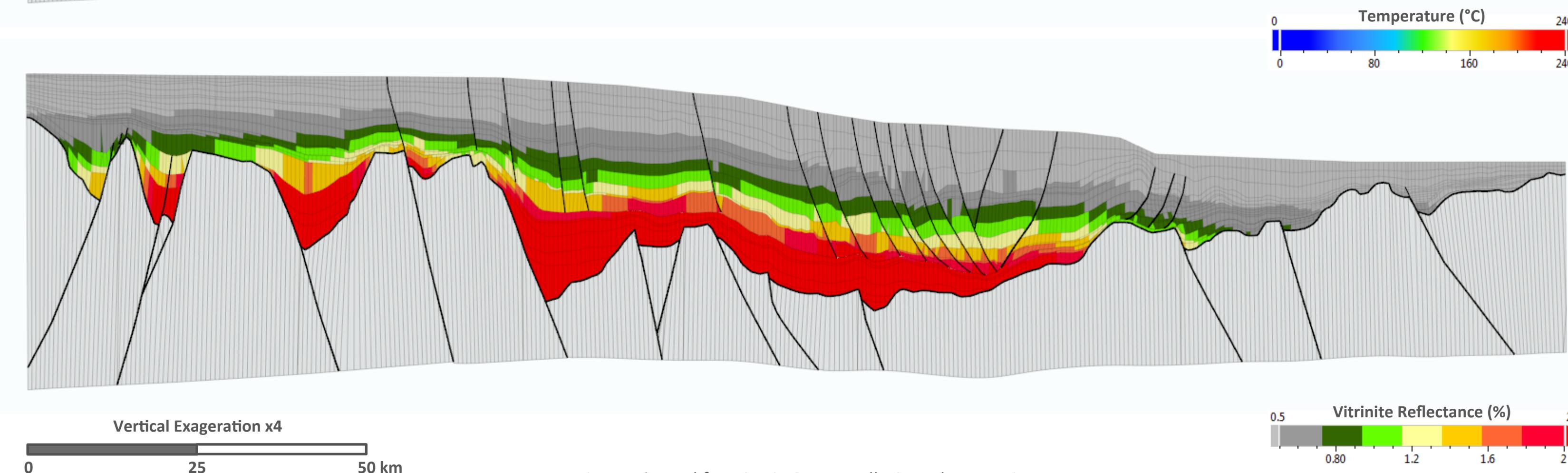
Thermal Regime

TEMPERATURE



24 Ma

VITRINITE REFLECTANCE



10

Vertical Exaggeration x4

25

50 km

A New Kinematic Tool for PSM in Structurally Complex Margins

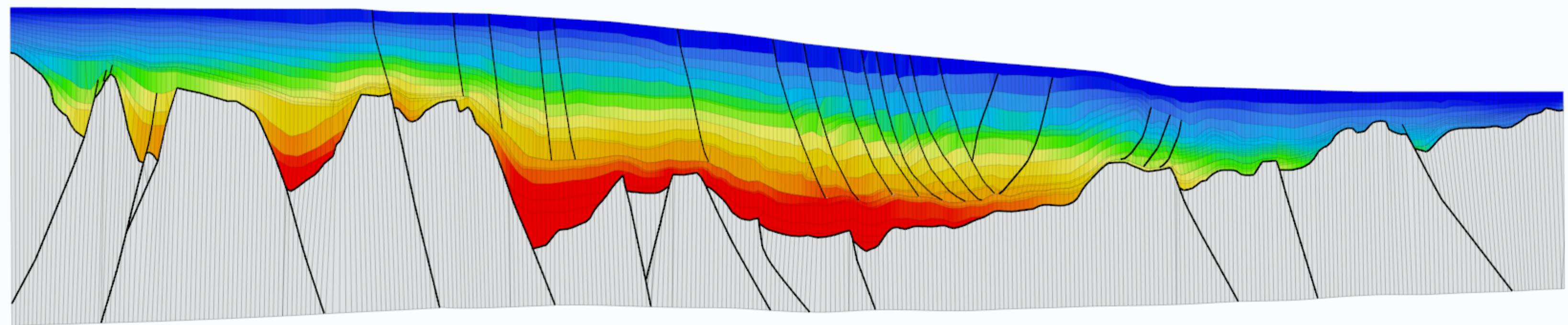
0.5 0.80 1.2 1.6 2
Vitrinite Reflectance (%)



Thermal Regime

17 Ma

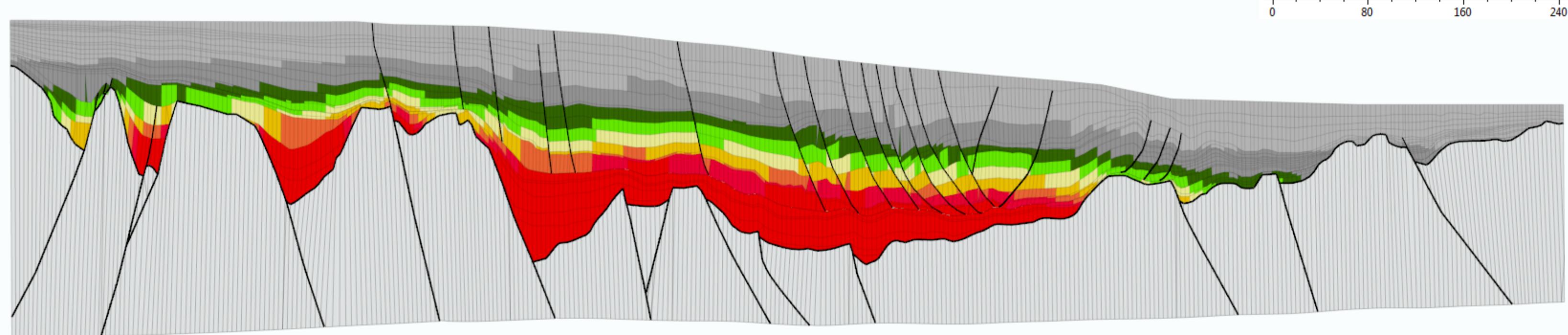
TEMPERATURE



Temperature (°C)

0	240	
0	80	160

VITRINITE REFLECTANCE



Vitrinite Reflectance (%)

0.5	2		
0.5	0.80	1.2	1.6

Vertical Exaggeration x4

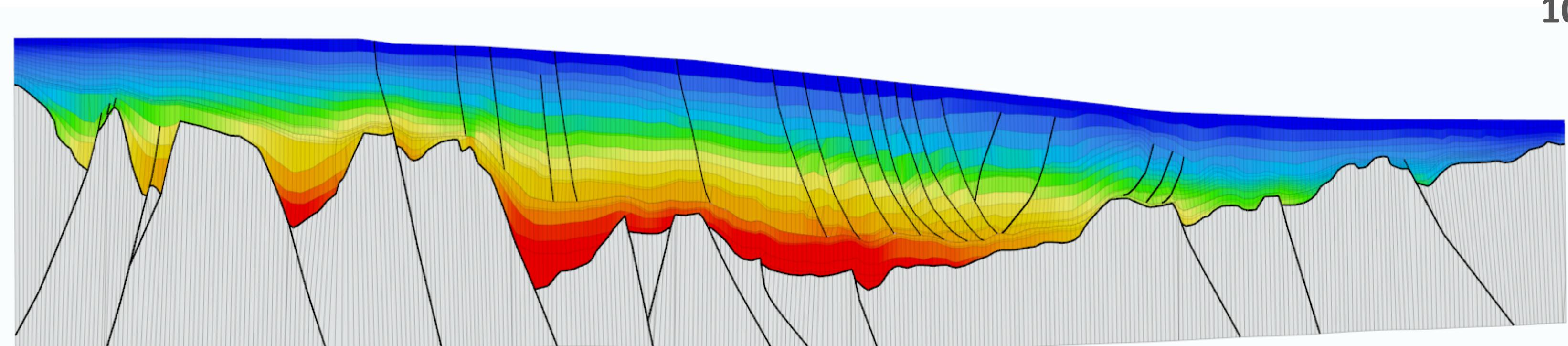
25

50 km



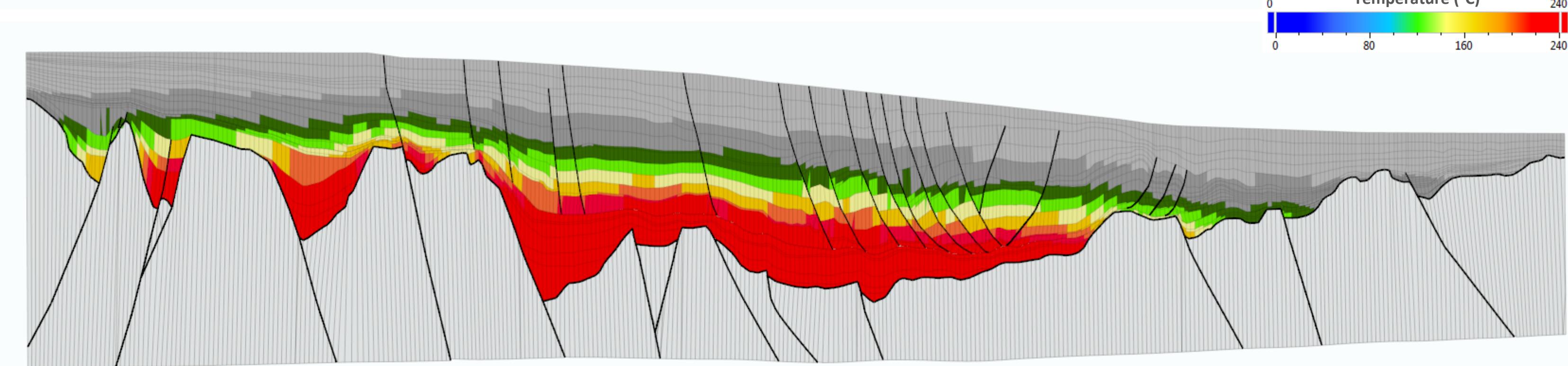
Thermal Regime

TEMPERATURE



10 Ma

VITRINITE REFLECTANCE



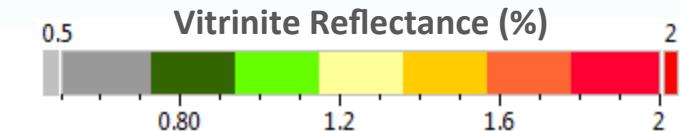
Vertical Exaggeration x4

12

25

50 km

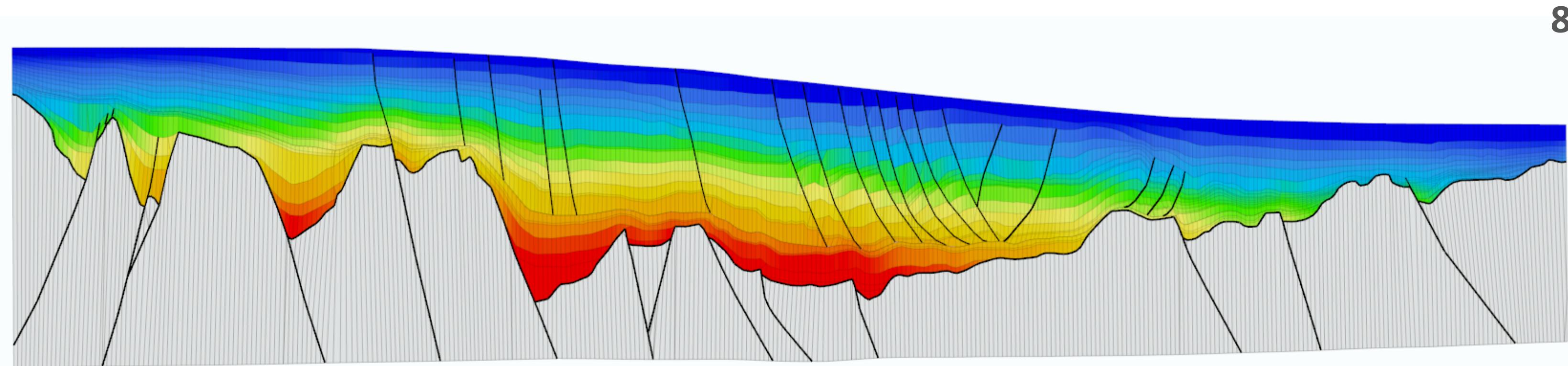
A New Kinematic Tool for PSM in Structurally Complex Margins





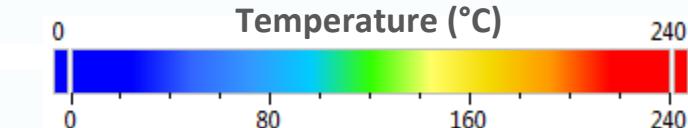
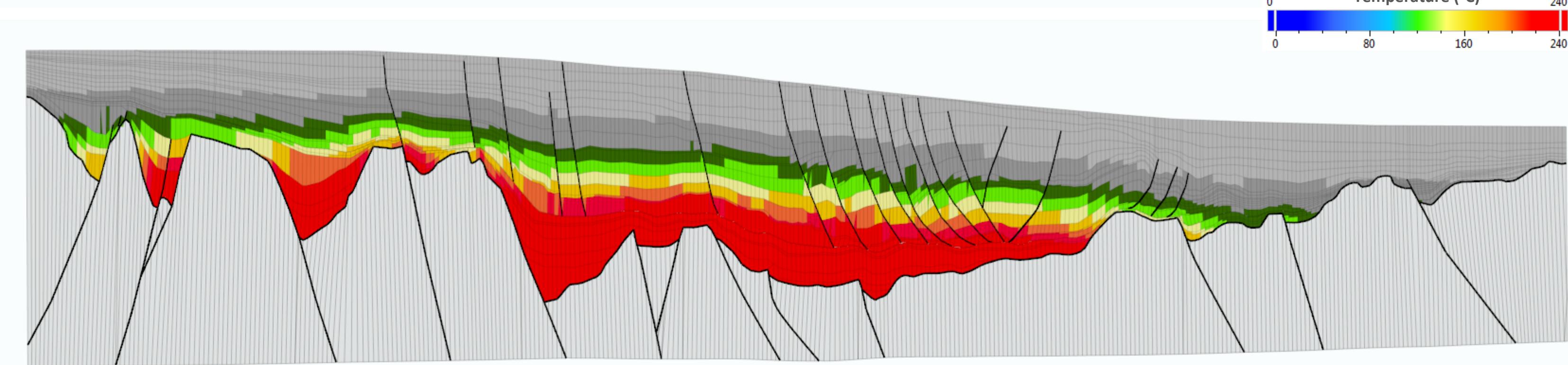
Thermal Regime

TEMPERATURE



8 Ma

VITRINITE REFLECTANCE

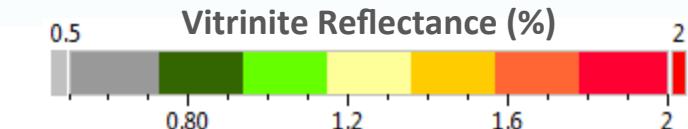


Vertical Exaggeration x4

0 25 50 km

13

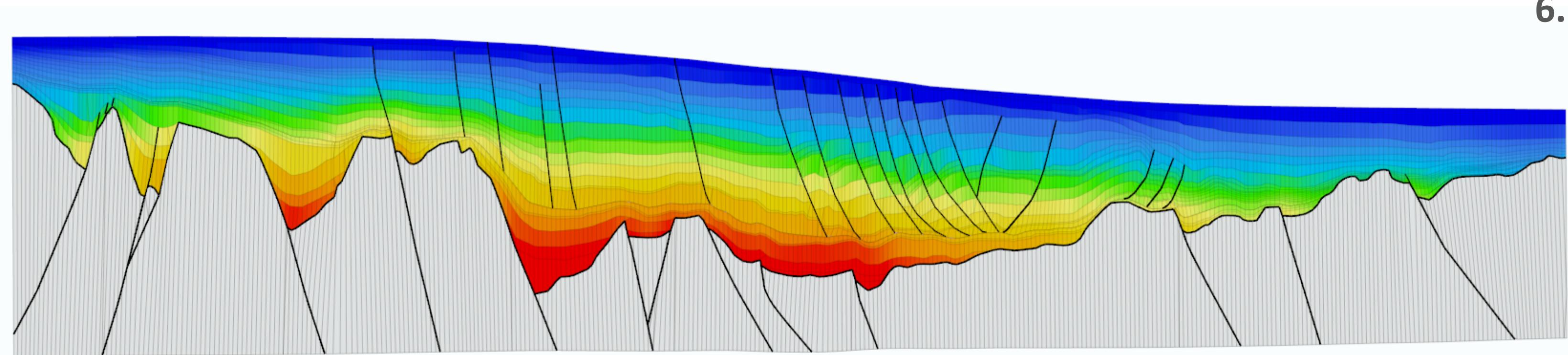
A New Kinematic Tool for PSM in Structurally Complex Margins





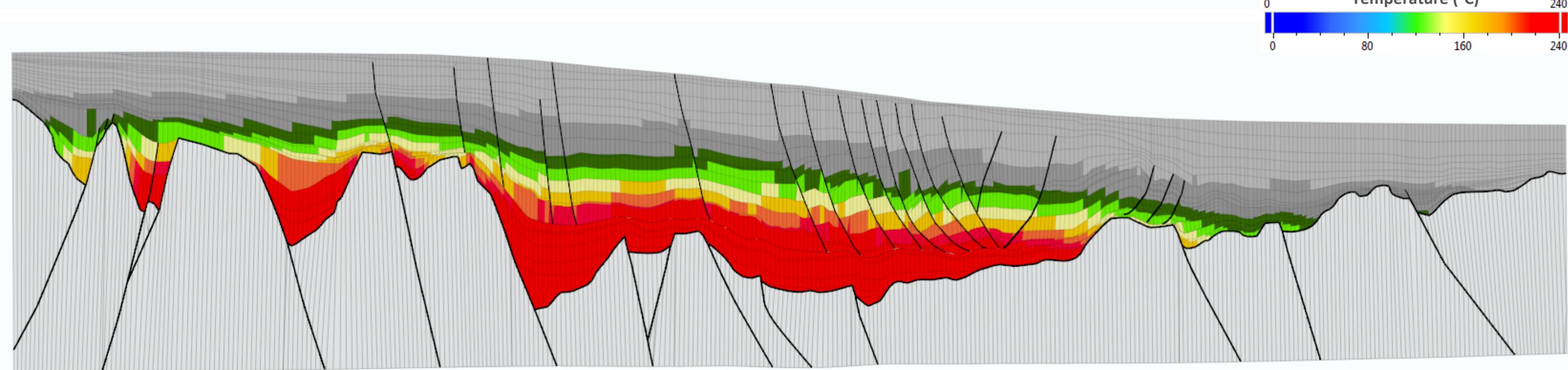
Thermal Regime

TEMPERATURE



6.5 Ma

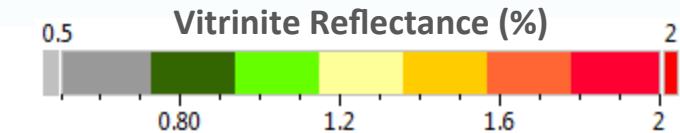
VITRINITE REFLECTANCE



14

Vertical Exaggeration x4

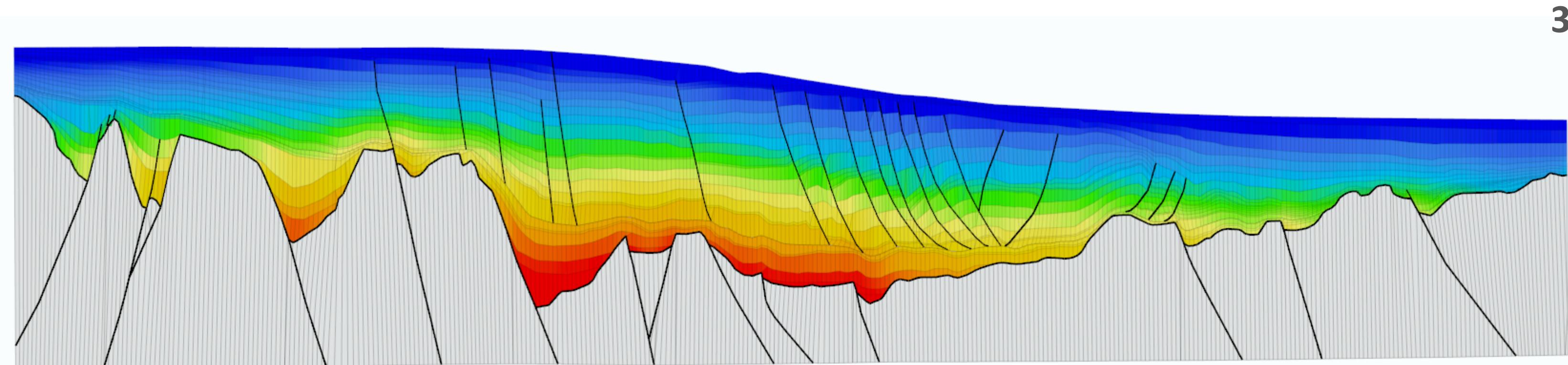
0 25 50 km





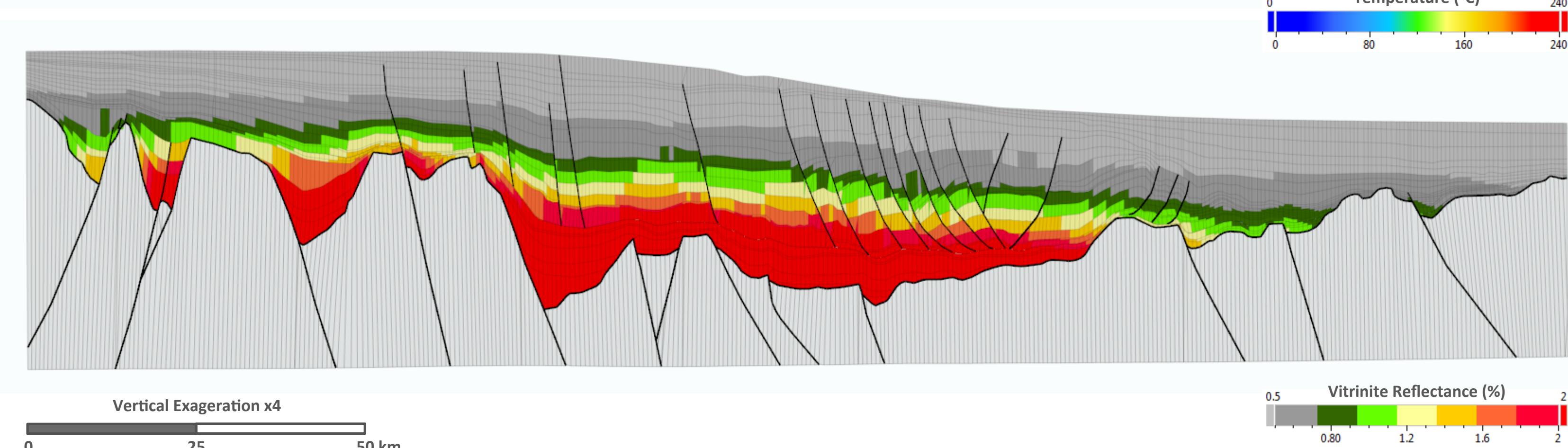
Thermal Regime

TEMPERATURE



3 Ma

VITRINITE REFLECTANCE



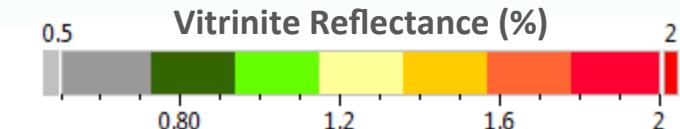
Vertical Exaggeration x4

15

25

50 km

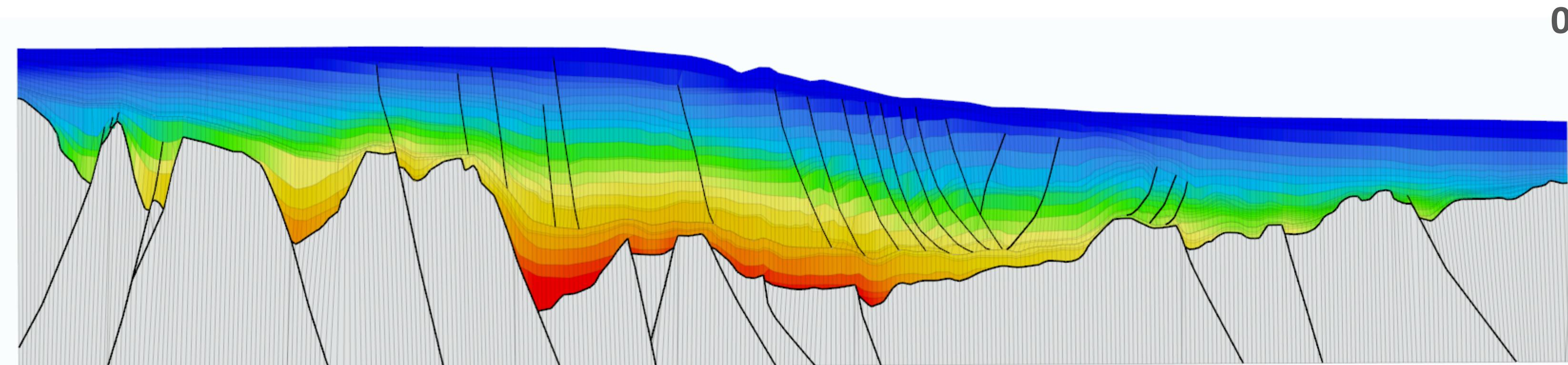
A New Kinematic Tool for PSM in Structurally Complex Margins





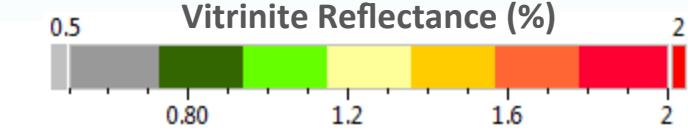
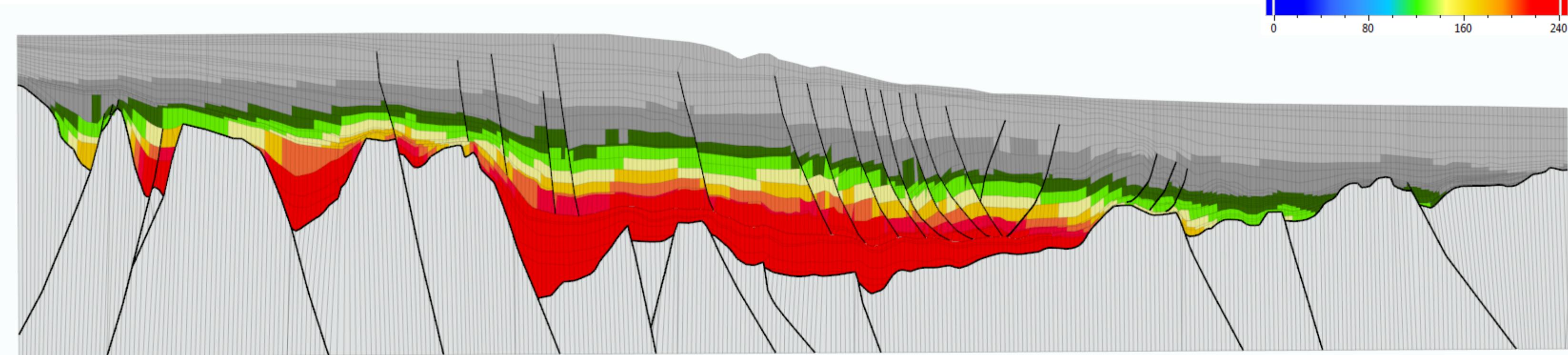
Thermal Regime

TEMPERATURE



0 Ma

VITRINITE REFLECTANCE



Vertical Exaggeration x4

0 25

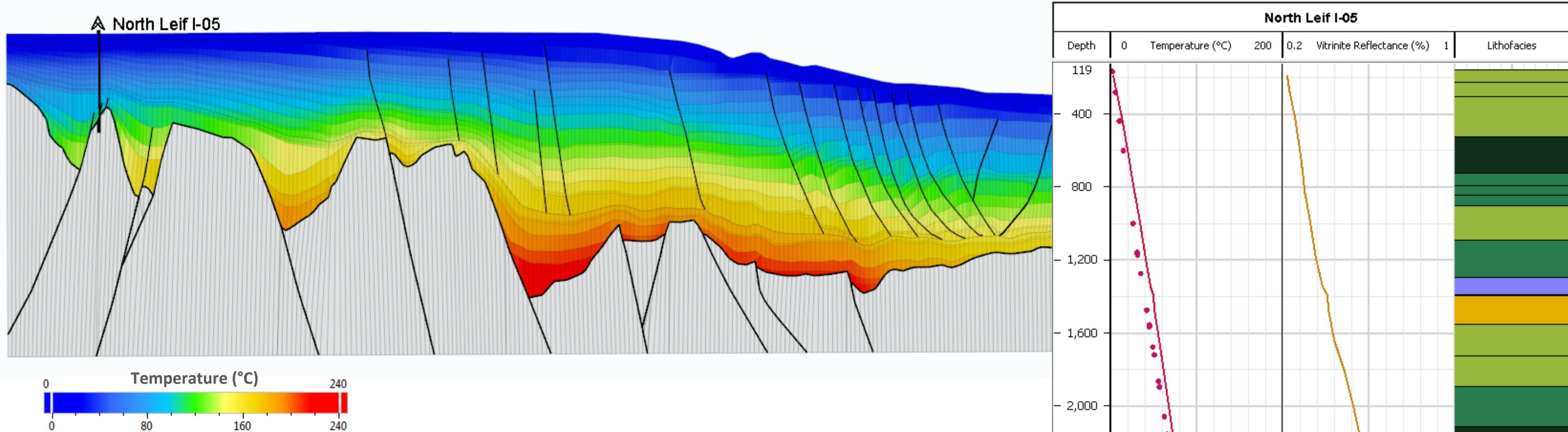
50 km

16

A New Kinematic Tool for PSM in Structurally Complex Margins



Thermal Calibration



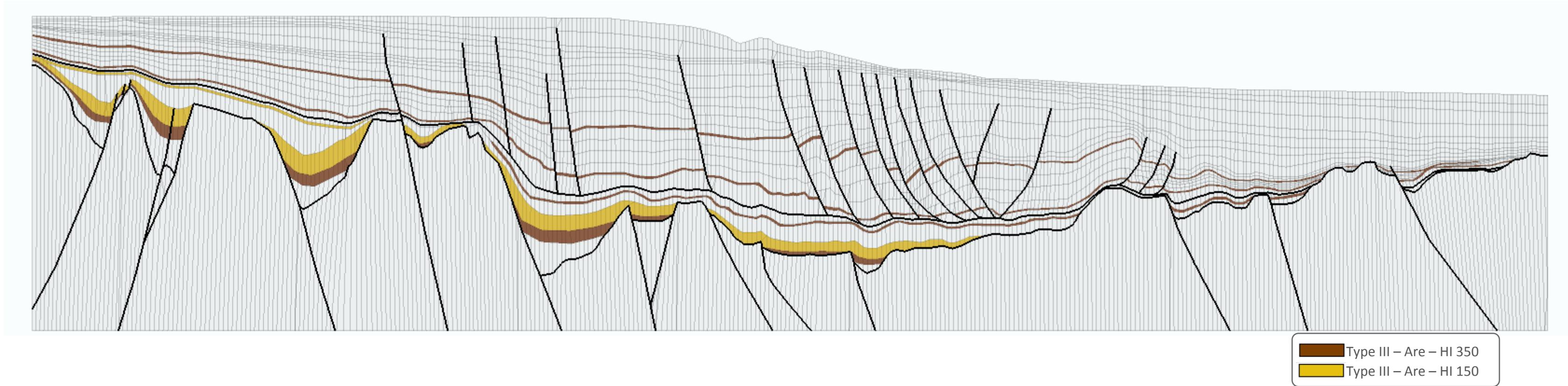
- The model is **properly calibrated** but only one well, located on the shelf, is available.
- A good confidence can still be given to the distal information thanks to the usage of a **heat flow history** coming from an evolutive lithospheric model.



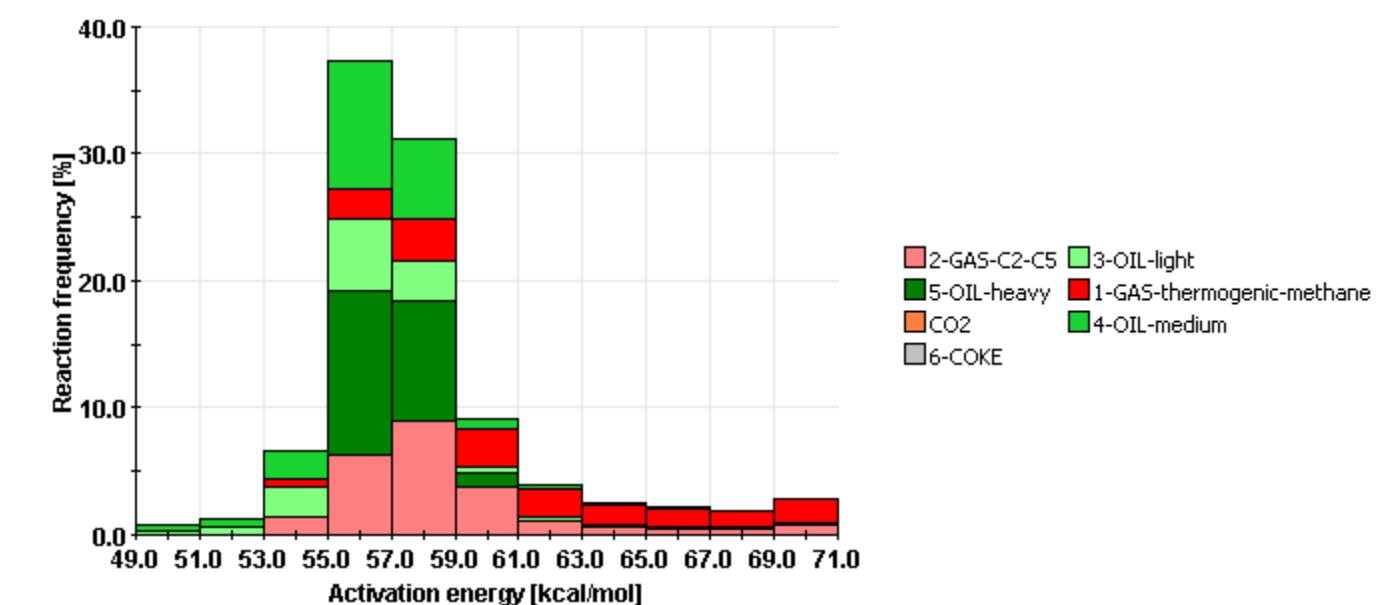
SOURCE ROCK MATURITY



Source Rock Definition



- Five Source Rock layers were introduced in the model from log measurement and regional understanding
- Source rocks are considered to be Type III and only vary with their HI value.
- Five moving classes (2 gases and 3 oils) are considered to characterize the generated fluid.

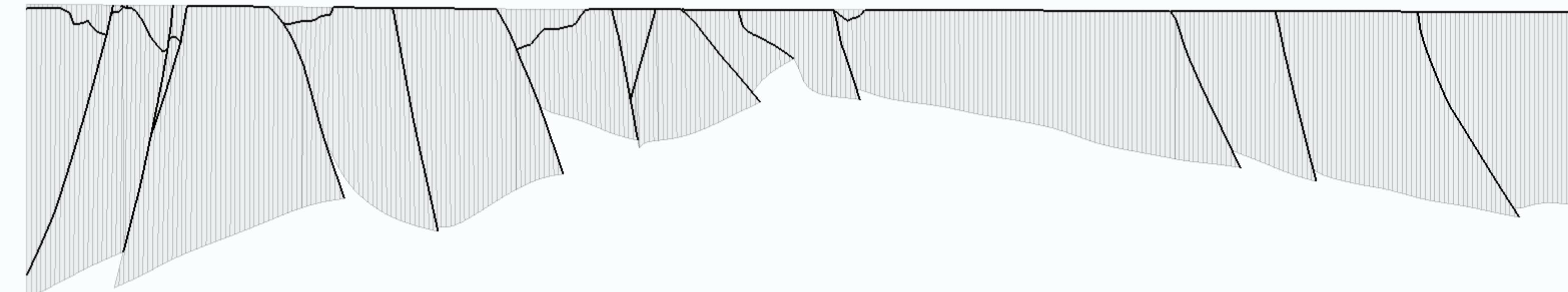




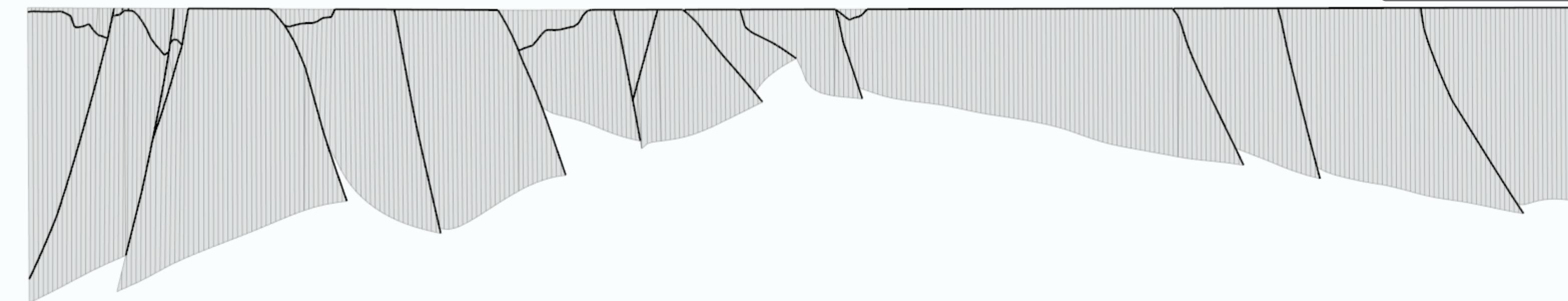
Source Rock Maturity

127 Ma

KEROGENS



TRANSFORMATION
RATIO



20

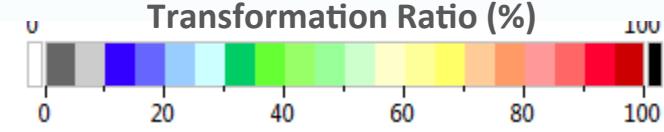
0

Vertical Exaggeration x4

25

50 km

A New Kinematic Tool for PSM in Structurally Complex Margins

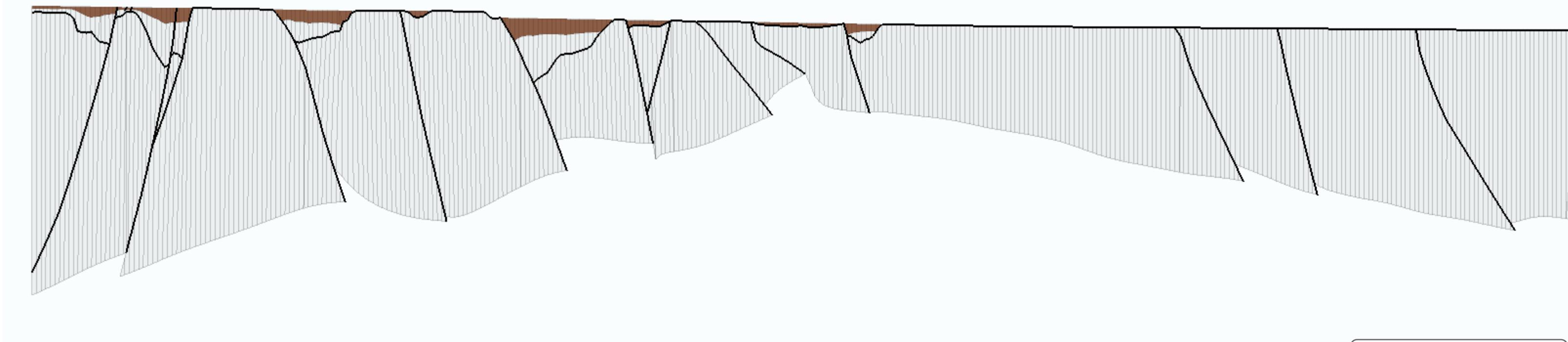




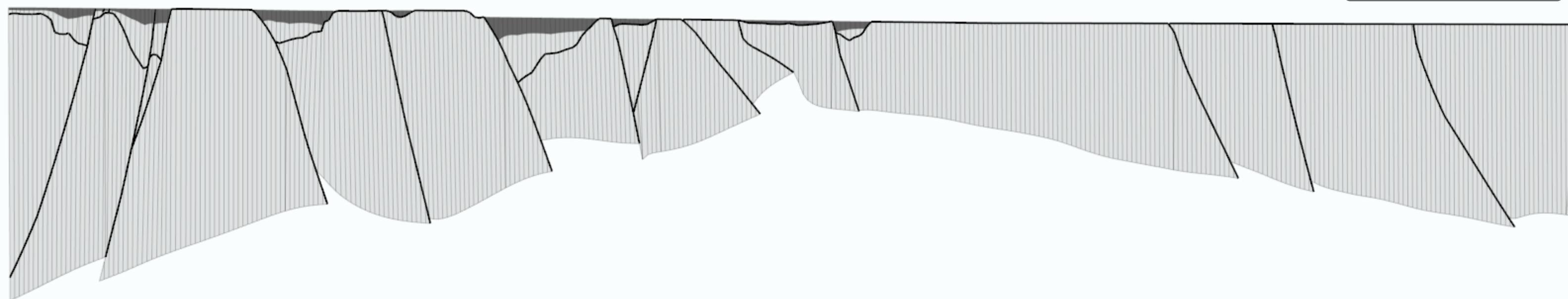
Source Rock Maturity

118 Ma

KEROGENS



TRANSFORMATION
RATIO



Vertical Exaggeration x4

0 25

50 km

21

A New Kinematic Tool for PSM in Structurally Complex Margins

Type III – Are – HI 350
Type III – Are – HI 150

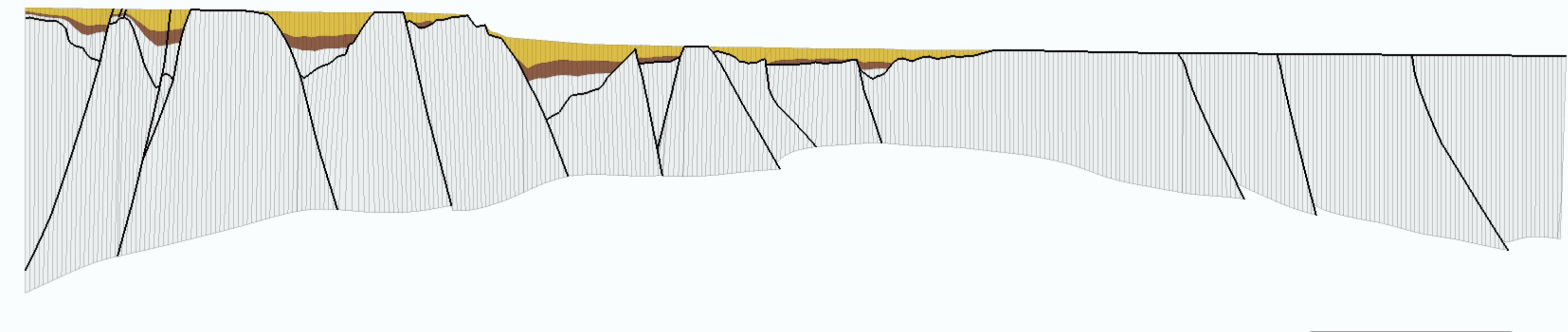
Transformation Ratio (%)
0 20 40 60 80 100



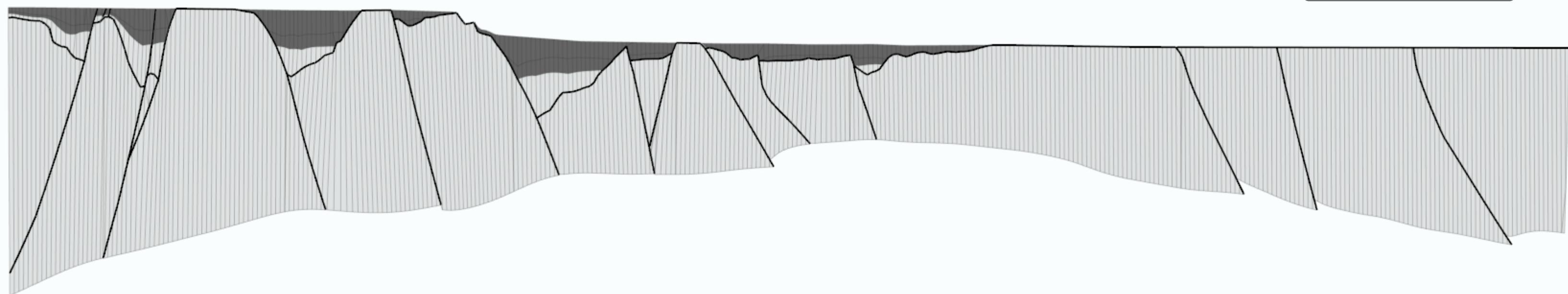
Source Rock Maturity

100 Ma

KEROGENS



TRANSFORMATION
RATIO



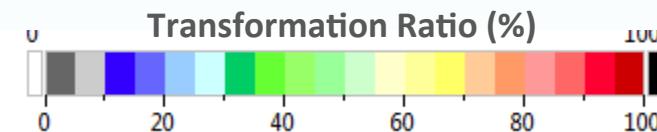
Vertical Exaggeration x4

25

50 km

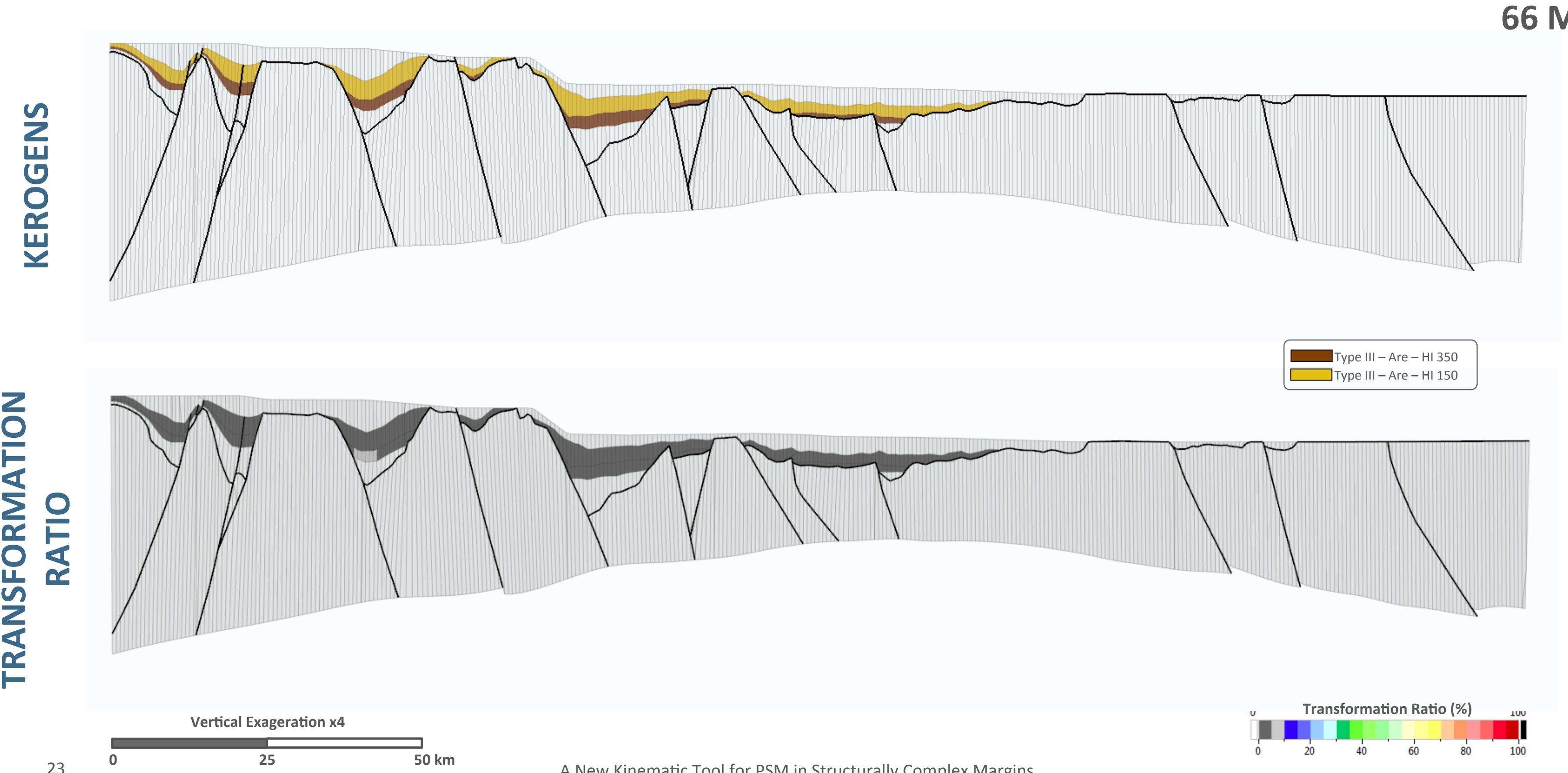
22

A New Kinematic Tool for PSM in Structurally Complex Margins



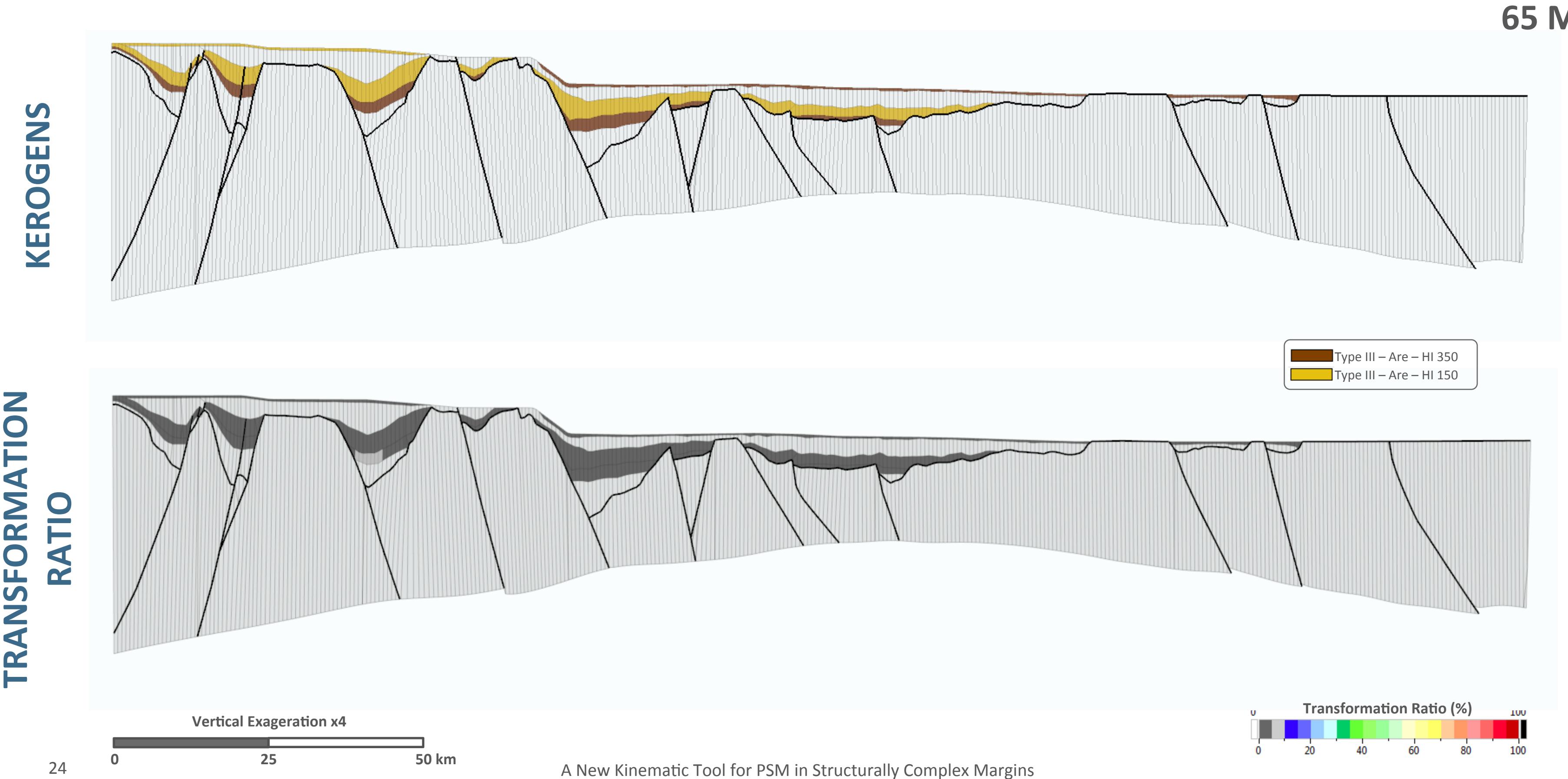


Source Rock Maturity





Source Rock Maturity

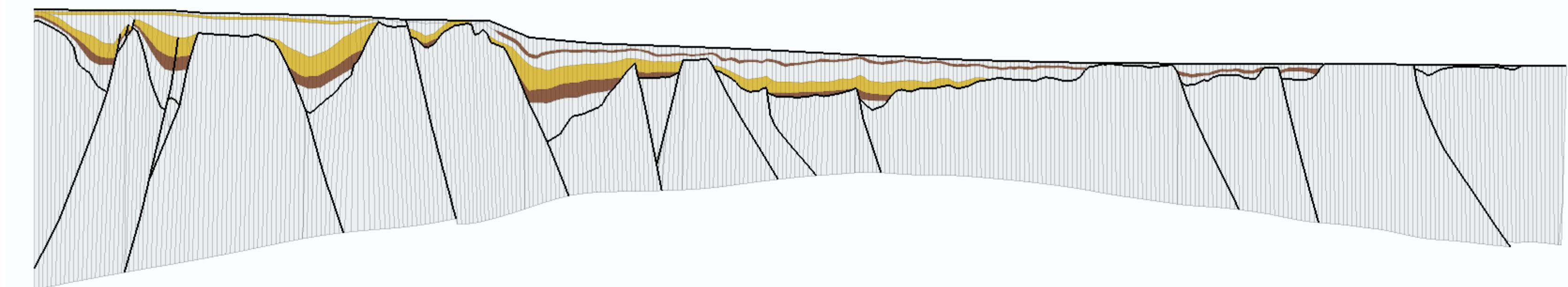




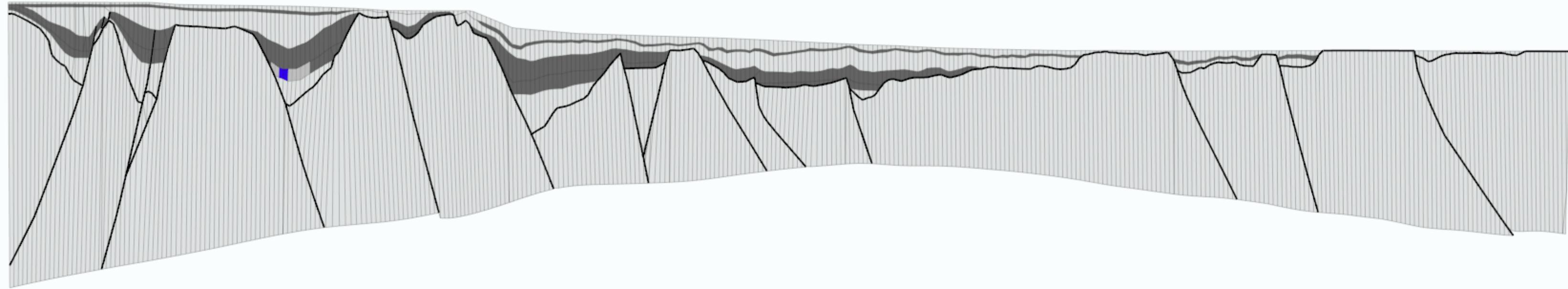
Source Rock Maturity

62 Ma

KEROGENS



TRANSFORMATION
RATIO



Vertical Exaggeration x4

25

25

50 km

Type III – Are – HI 350
Type III – Are – HI 150

Transformation Ratio (%)
0 20 40 60 80 100

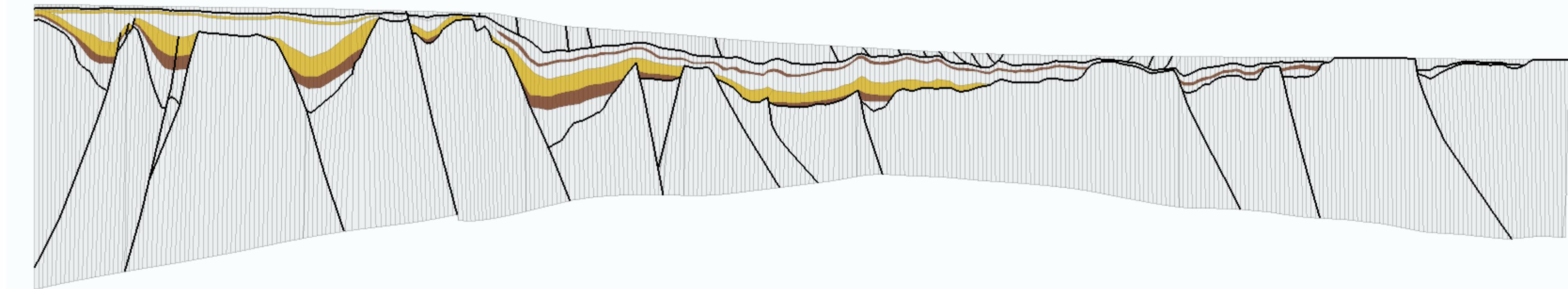
A New Kinematic Tool for PSM in Structurally Complex Margins



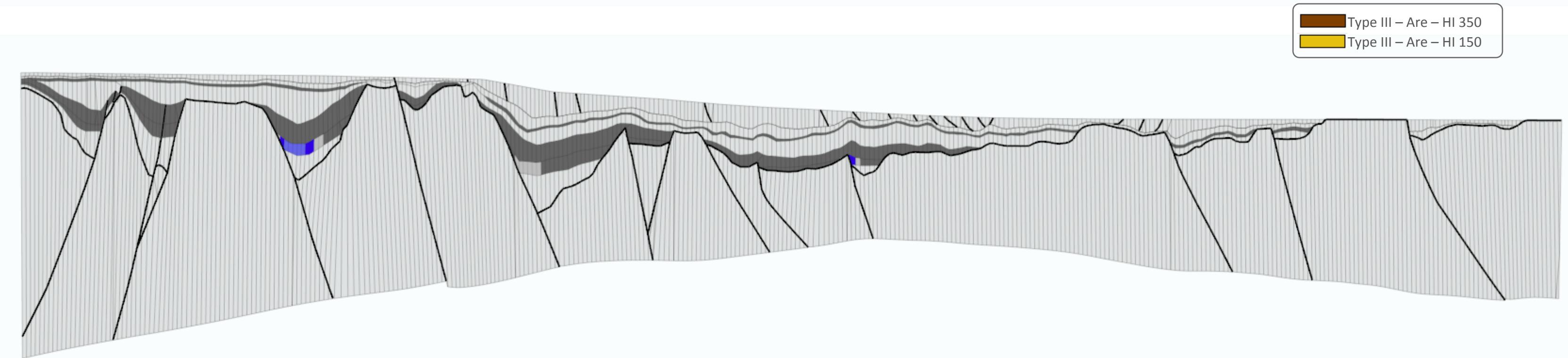
Source Rock Maturity

56 Ma

KEROGENS



TRANSFORMATION
RATIO



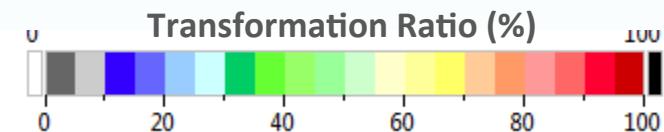
Vertical Exaggeration x4

25

50 km

26

A New Kinematic Tool for PSM in Structurally Complex Margins

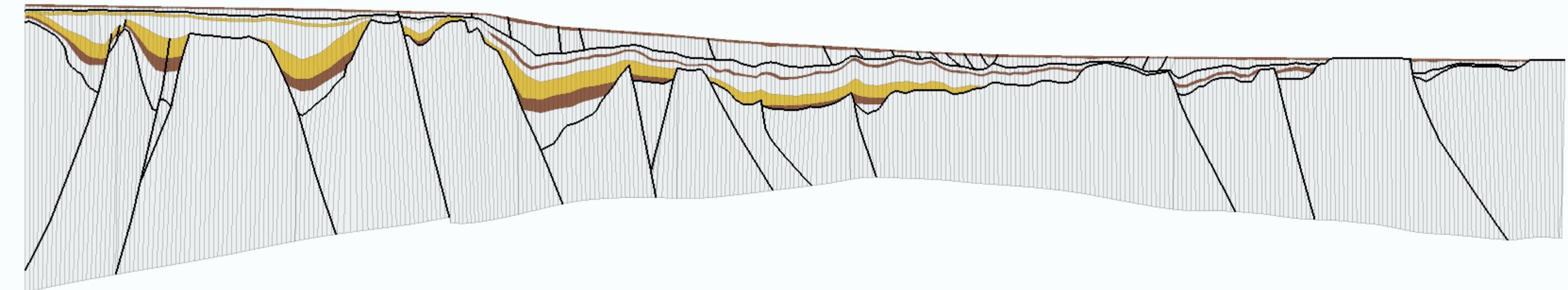




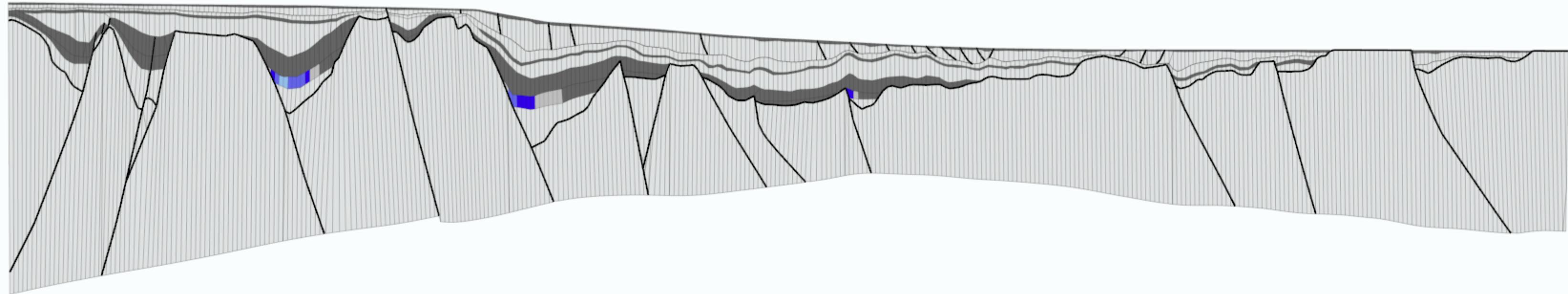
Source Rock Maturity

54 Ma

KEROGENS



TRANSFORMATION
RATIO

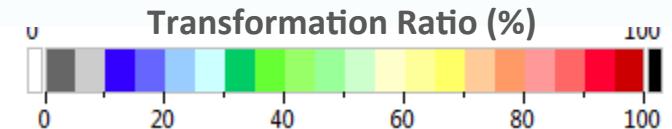


Vertical Exaggeration x4

27

50 km

A New Kinematic Tool for PSM in Structurally Complex Margins

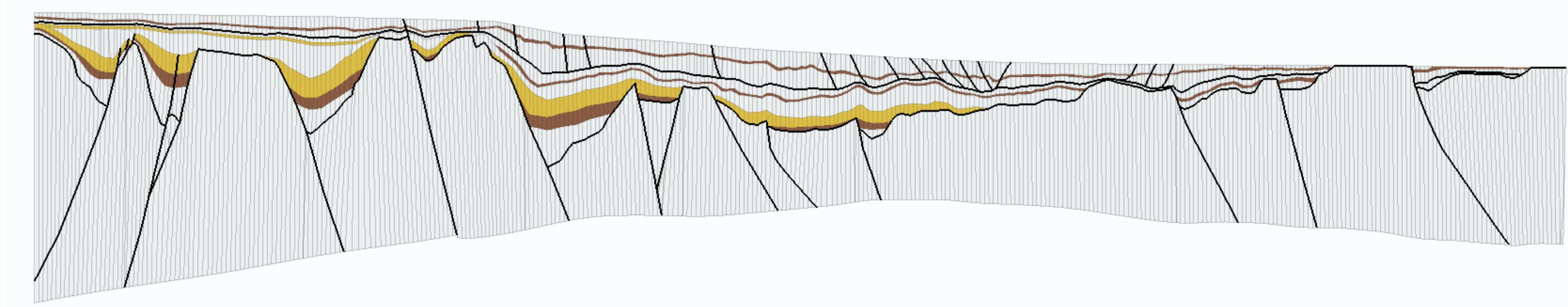




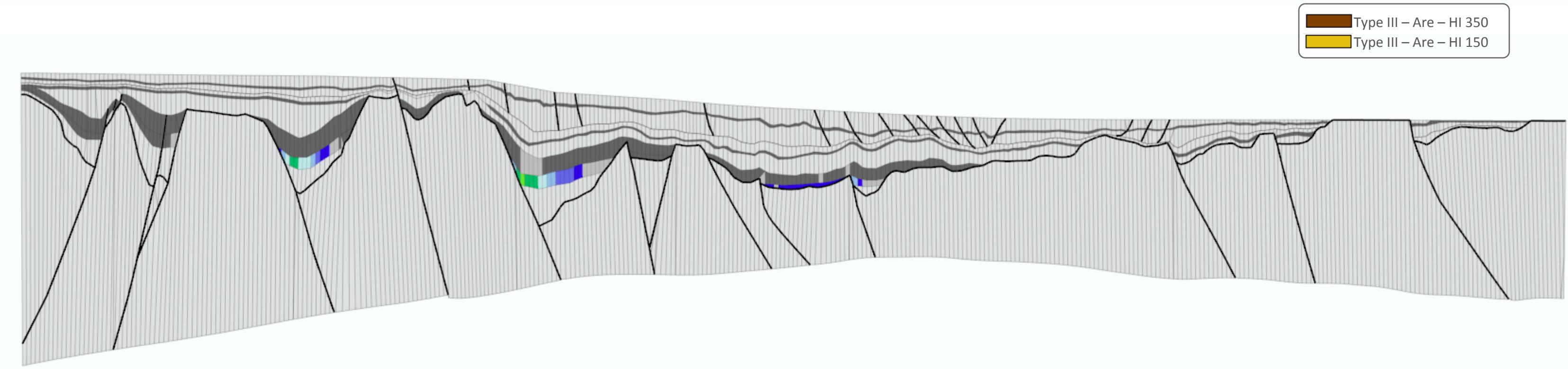
Source Rock Maturity

51 Ma

KEROGENS



TRANSFORMATION
RATIO

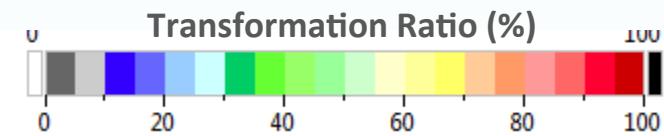


Vertical Exaggeration x4

28

50 km

A New Kinematic Tool for PSM in Structurally Complex Margins

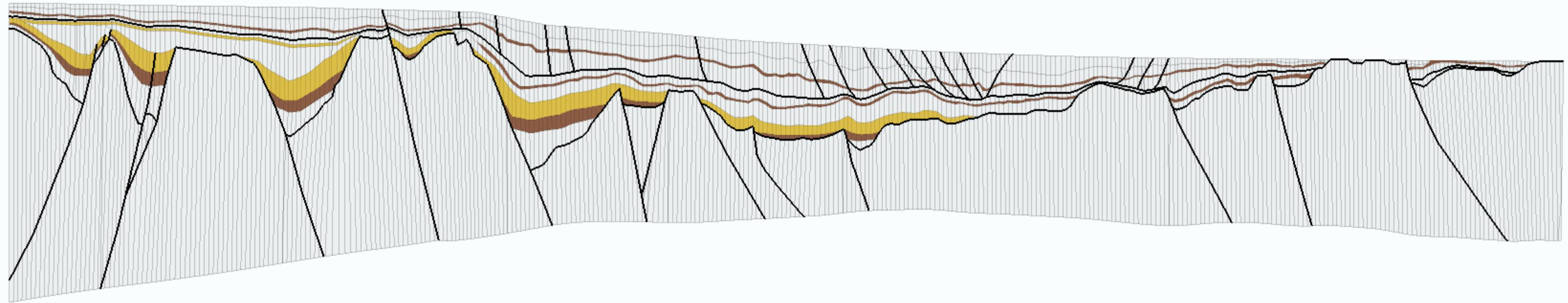




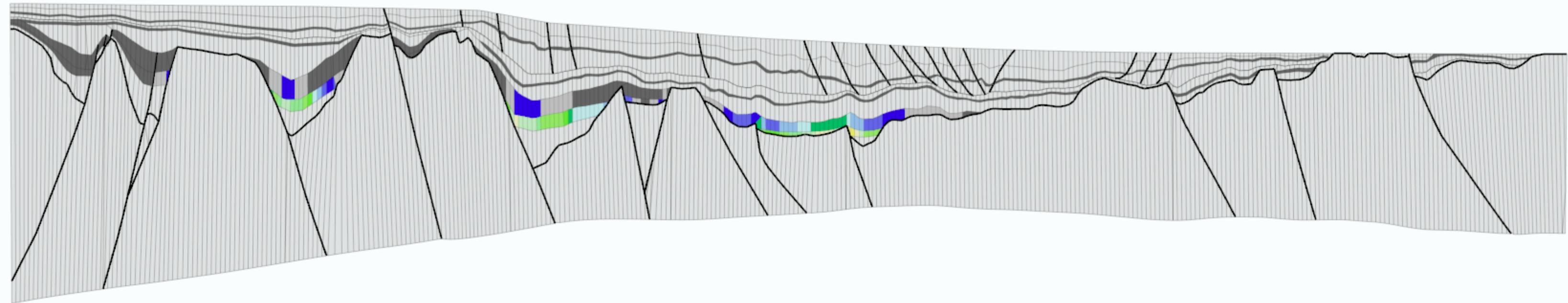
Source Rock Maturity

49 Ma

KEROGENS



TRANSFORMATION
RATIO



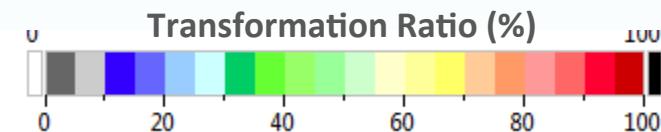
Vertical Exaggeration x4

25

50 km

29

A New Kinematic Tool for PSM in Structurally Complex Margins

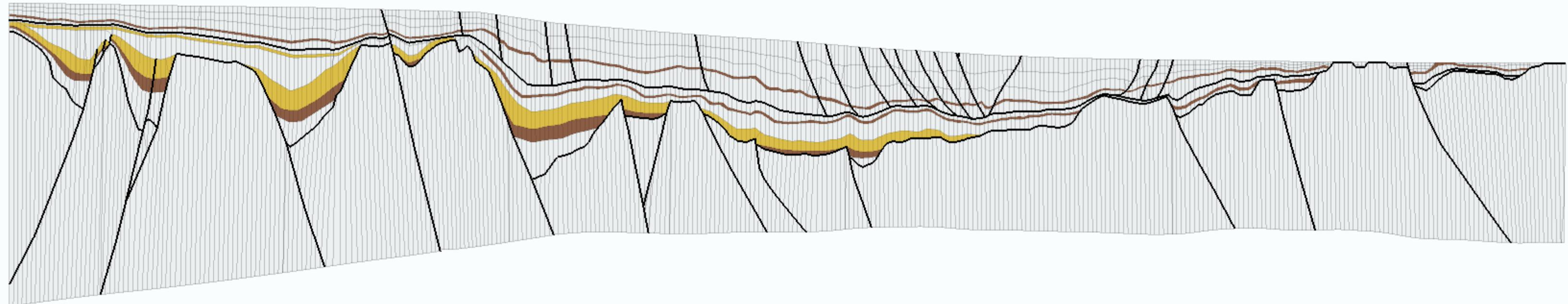




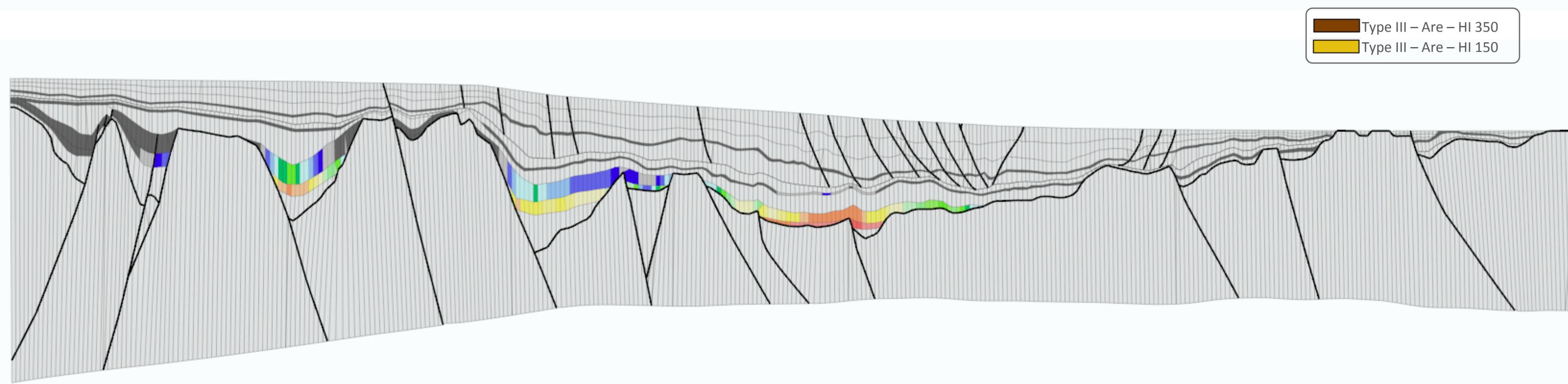
Source Rock Maturity

47 Ma

KEROGENS

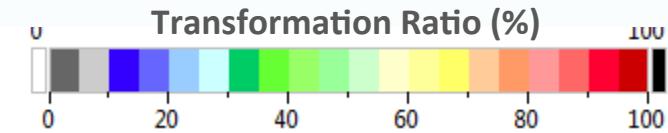


TRANSFORMATION
RATIO



Vertical Exaggeration x4

30 0 25 50 km



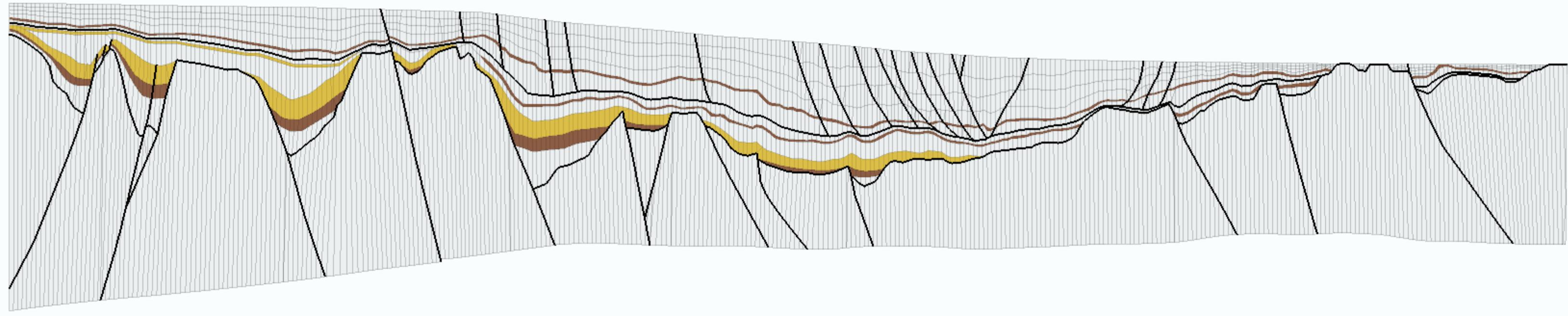
A New Kinematic Tool for PSM in Structurally Complex Margins



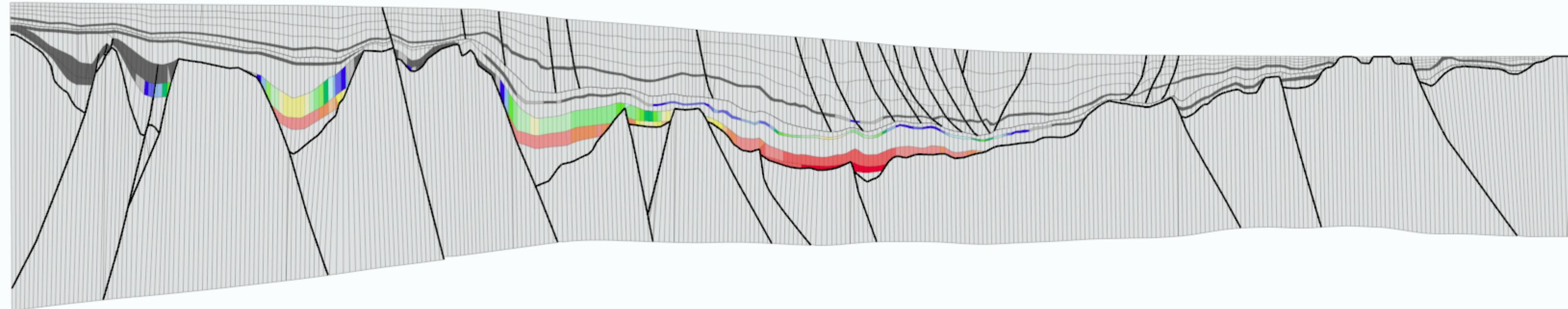
Source Rock Maturity

45 Ma

KEROGENS



TRANSFORMATION
RATIO

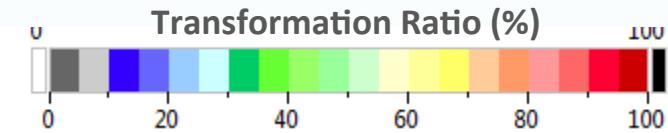


Vertical Exaggeration x4

31

50 km

A New Kinematic Tool for PSM in Structurally Complex Margins

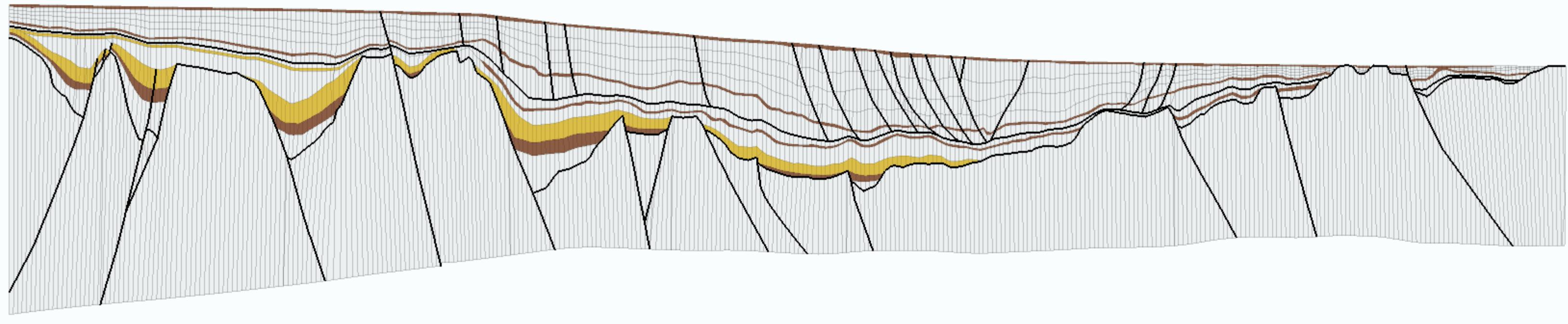




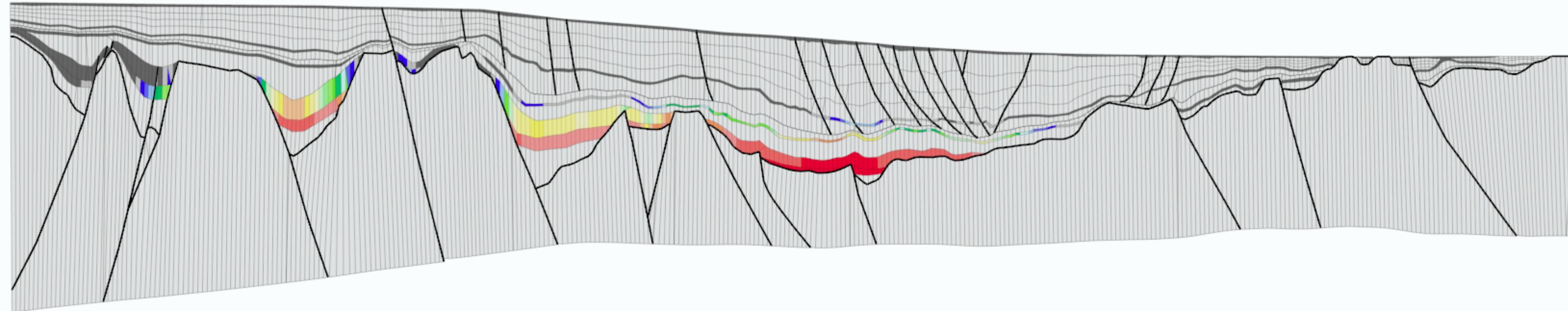
Source Rock Maturity

44 Ma

KEROGENS



TRANSFORMATION
RATIO

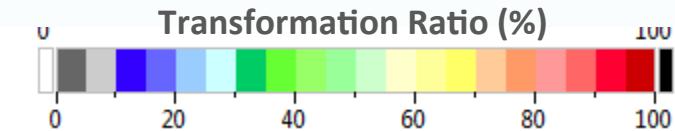


Vertical Exaggeration x4

32

50 km

A New Kinematic Tool for PSM in Structurally Complex Margins

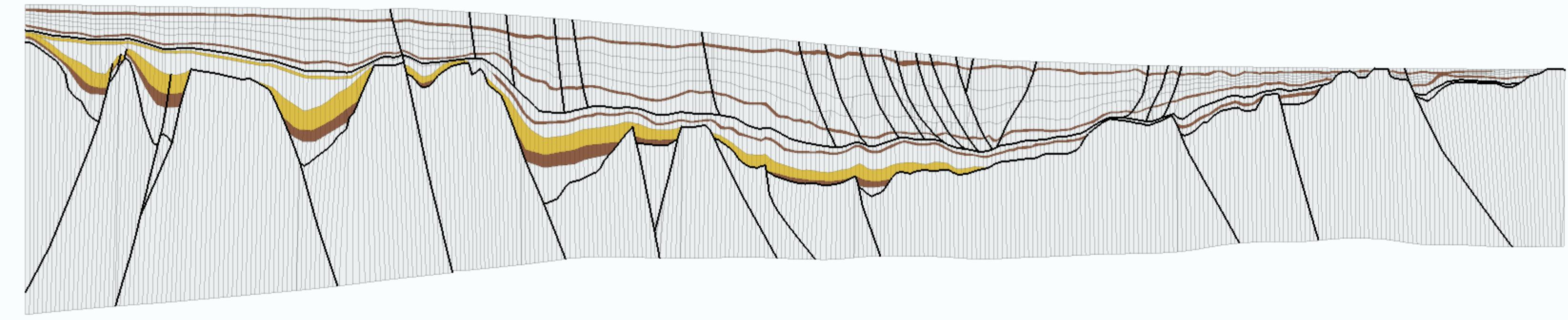




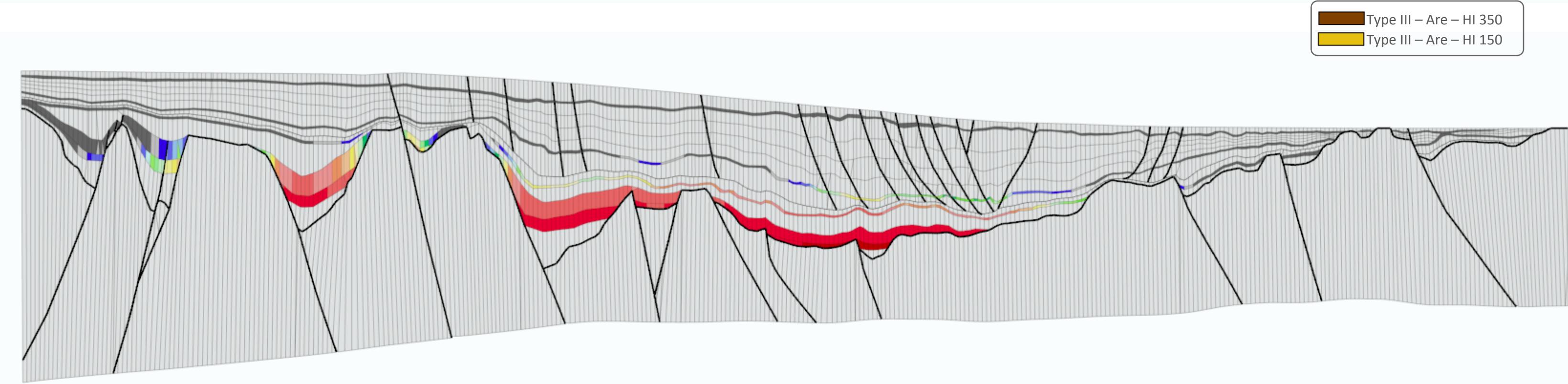
Source Rock Maturity

39 Ma

KEROGENS



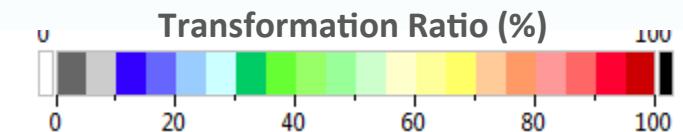
TRANSFORMATION
RATIO



Vertical Exaggeration x4



50 km

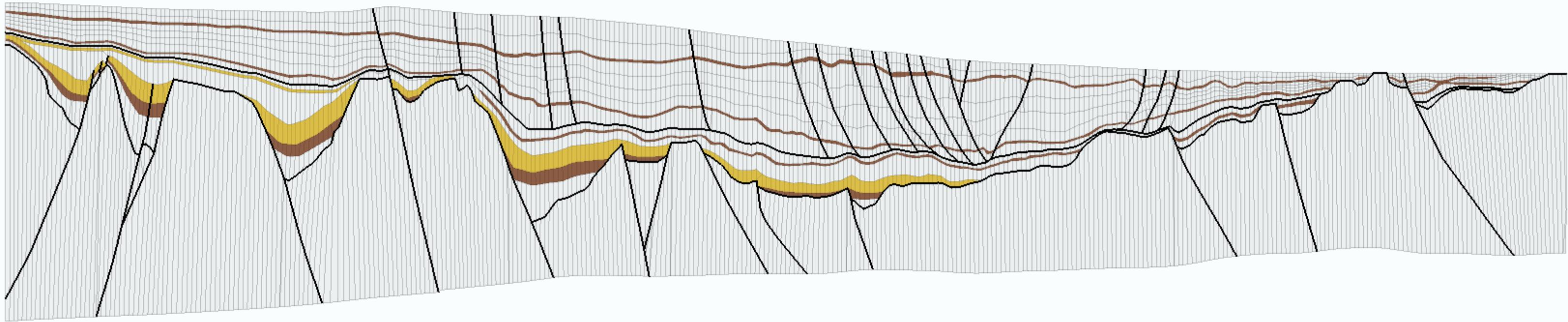




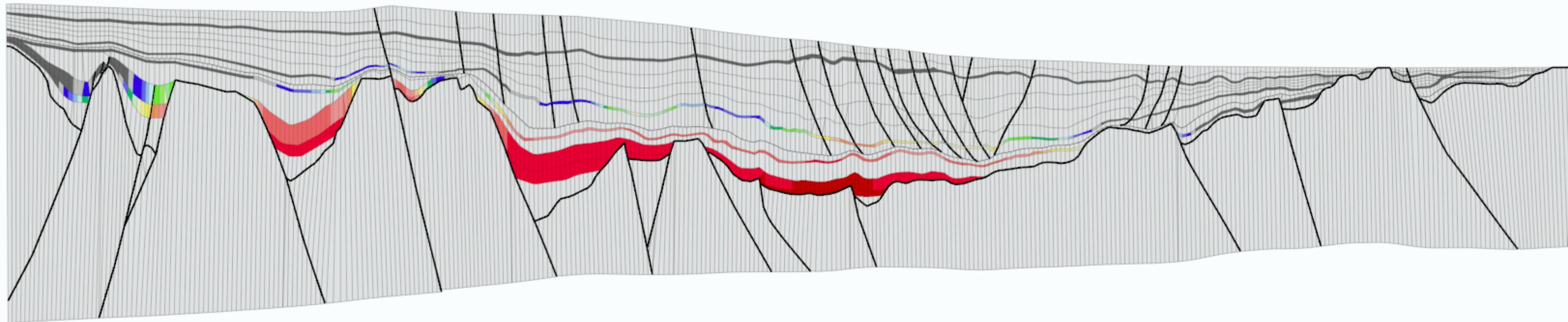
Source Rock Maturity

34 Ma

KEROGENS



TRANSFORMATION
RATIO

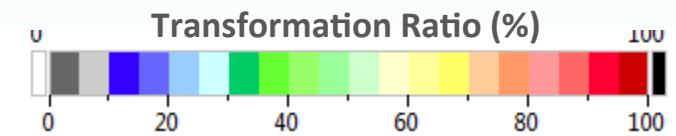


Vertical Exaggeration x4



50 km

34



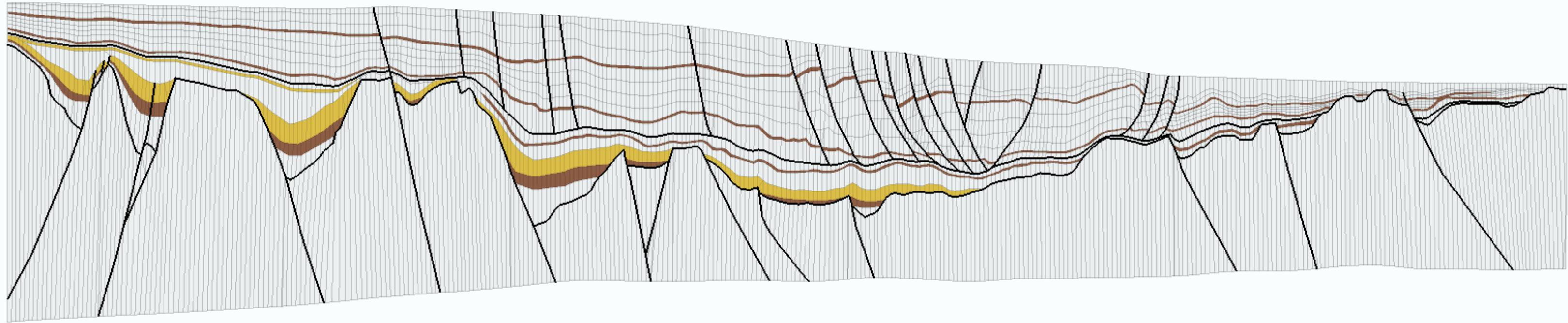
A New Kinematic Tool for PSM in Structurally Complex Margins



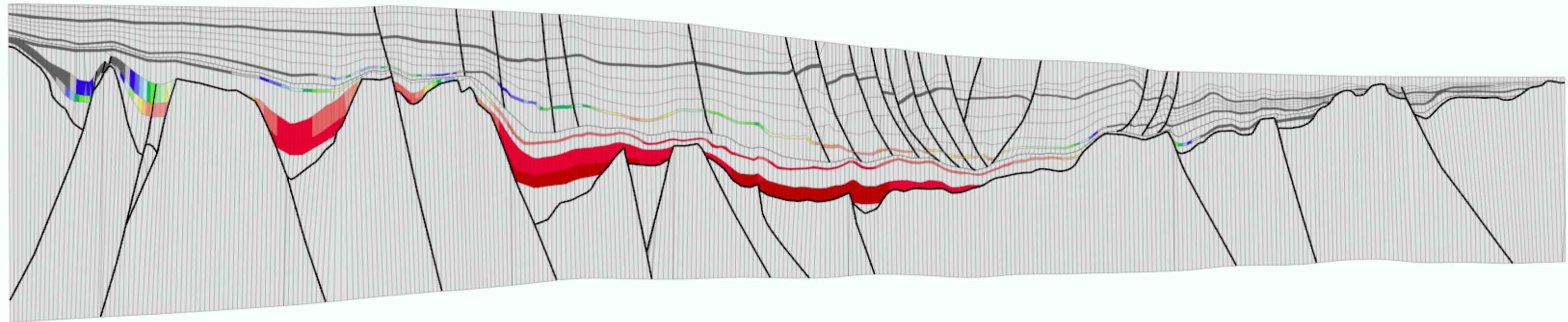
Source Rock Maturity

30 Ma

KEROGENS



TRANSFORMATION
RATIO

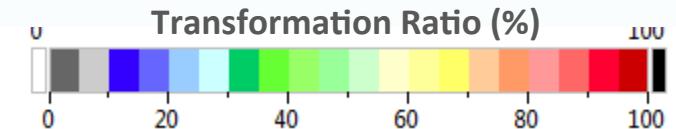


Vertical Exaggeration x4

35

25

50 km

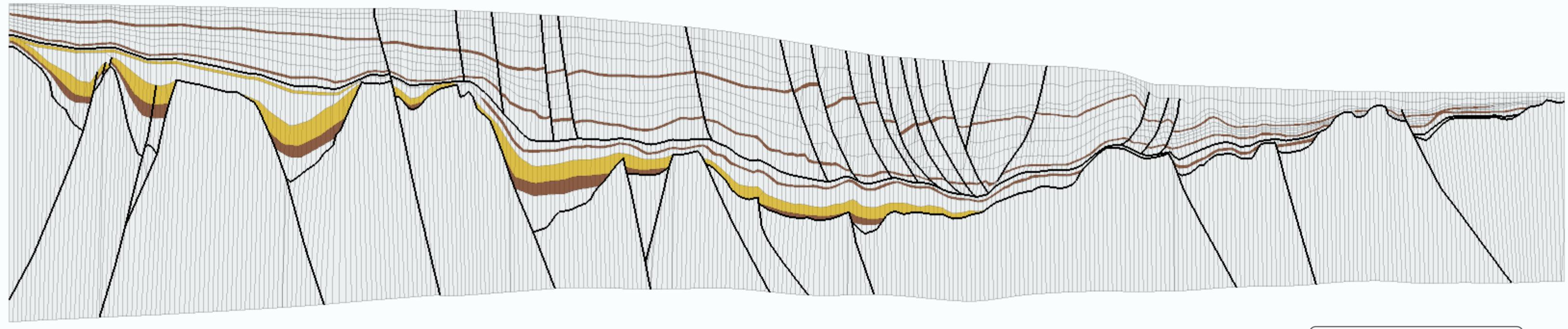




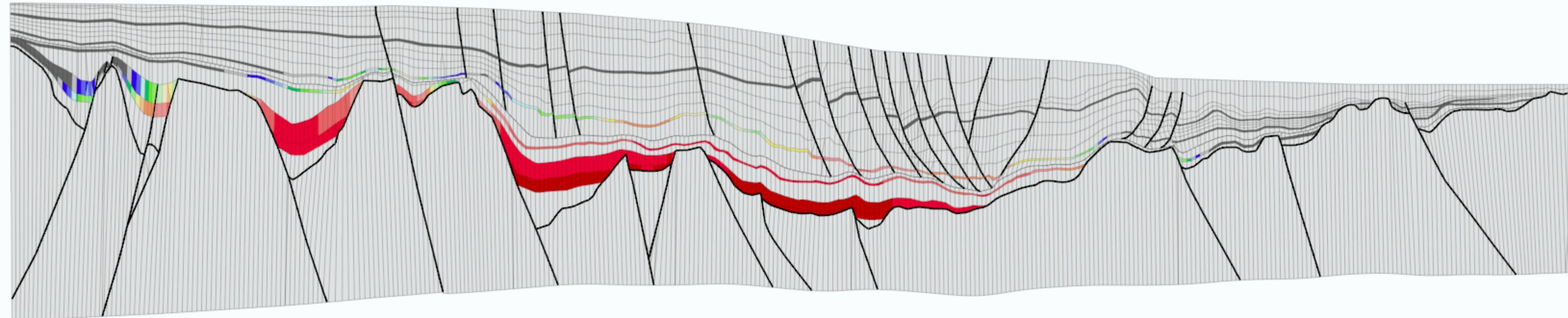
Source Rock Maturity

27 Ma

KEROGENS



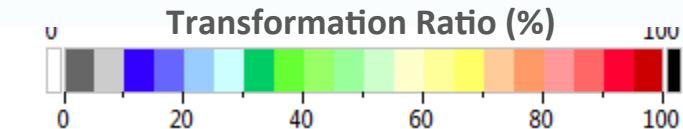
TRANSFORMATION
RATIO



Vertical Exaggeration x4



50 km

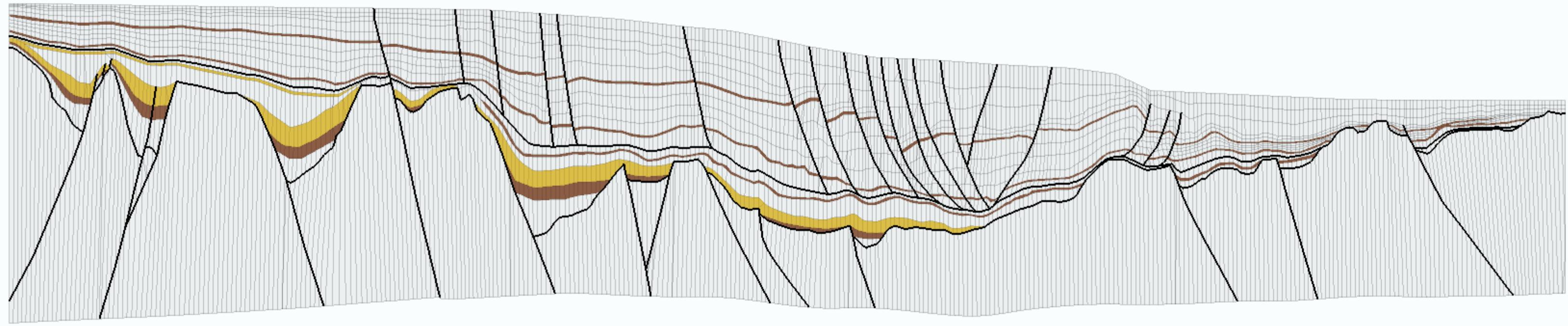




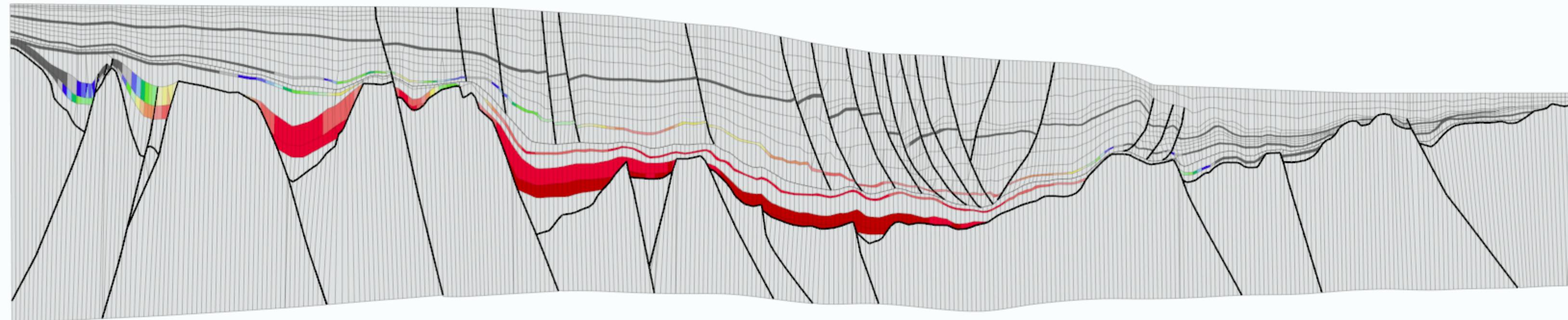
Source Rock Maturity

24 Ma

KEROGENS



TRANSFORMATION
RATIO

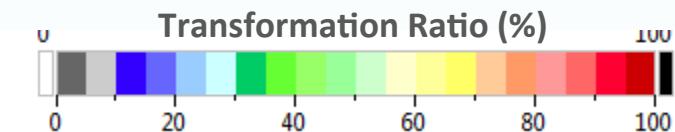


Vertical Exaggeration x4

37

50 km

A New Kinematic Tool for PSM in Structurally Complex Margins

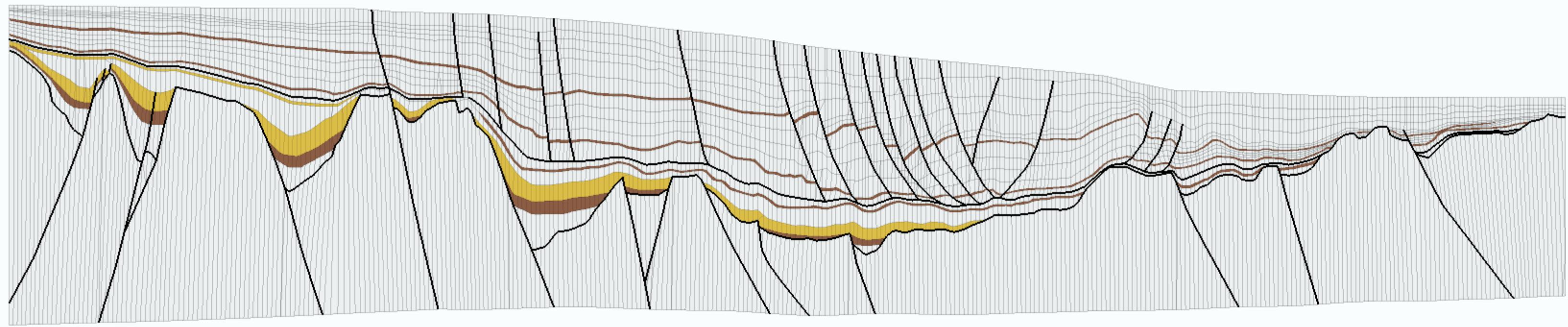




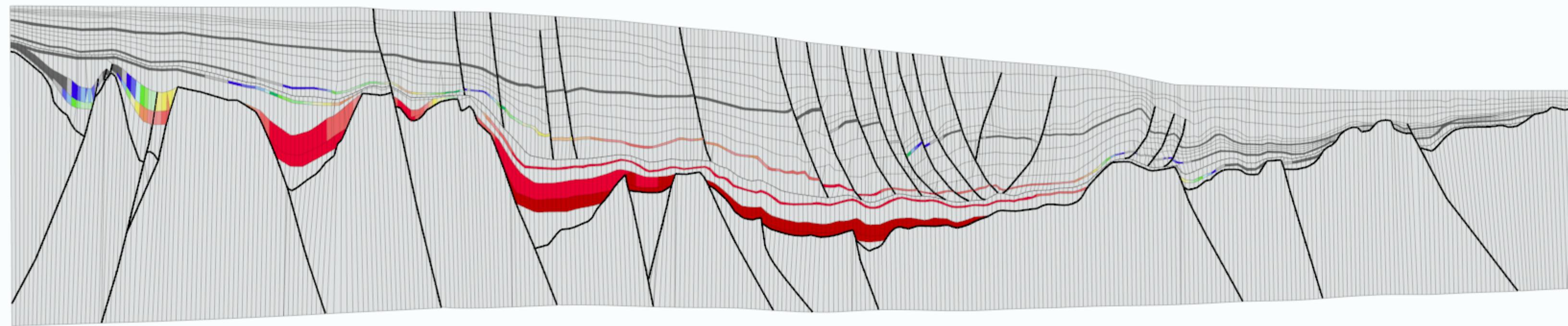
Source Rock Maturity

17 Ma

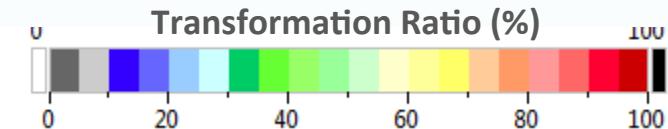
KEROGENS



TRANSFORMATION
RATIO



Vertical Exaggeration x4

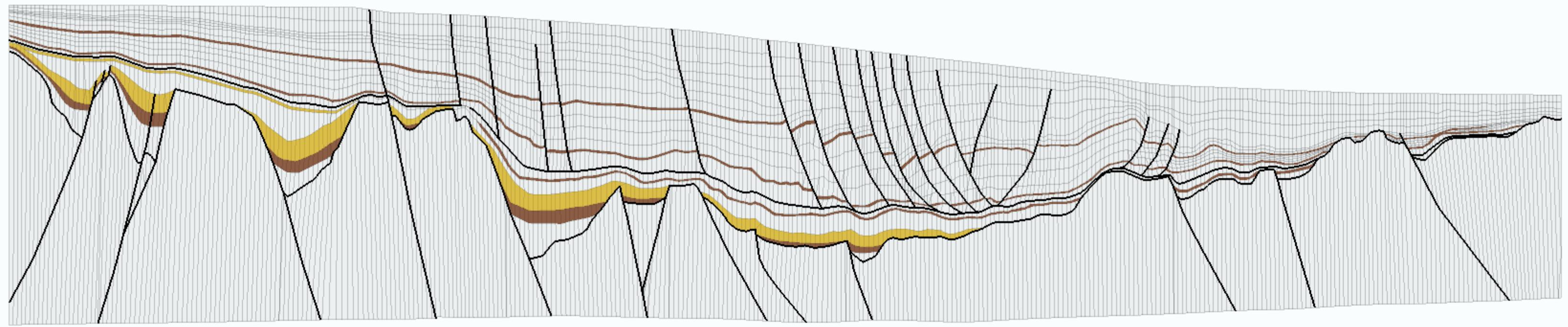




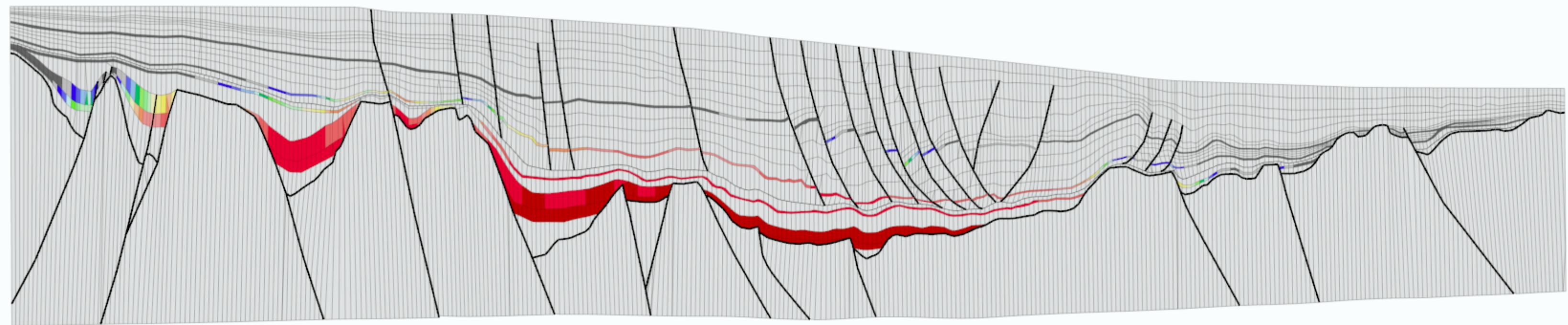
Source Rock Maturity

10 Ma

KEROGENS



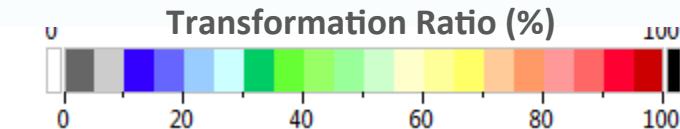
TRANSFORMATION
RATIO



Vertical Exaggeration x4

39

50 km

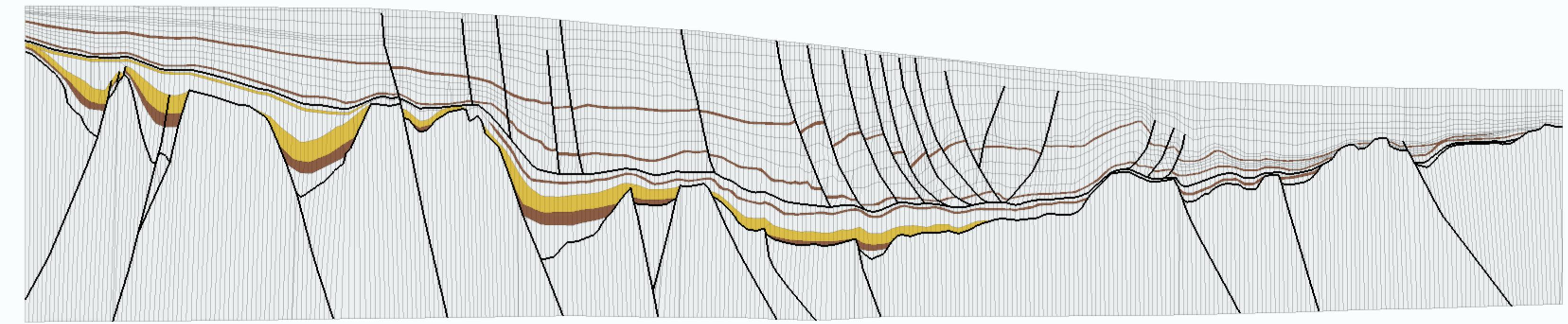




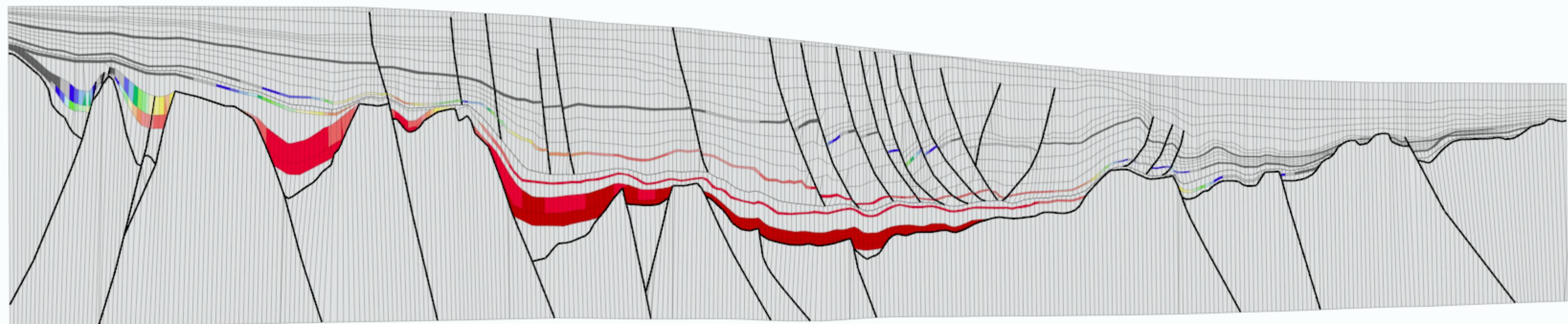
Source Rock Maturity

8 Ma

KEROGENS



TRANSFORMATION
RATIO

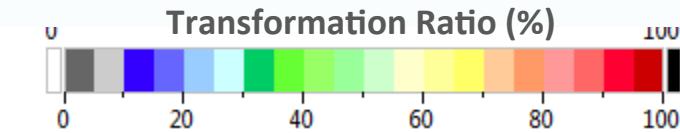


Vertical Exaggeration x4

40

25

50 km



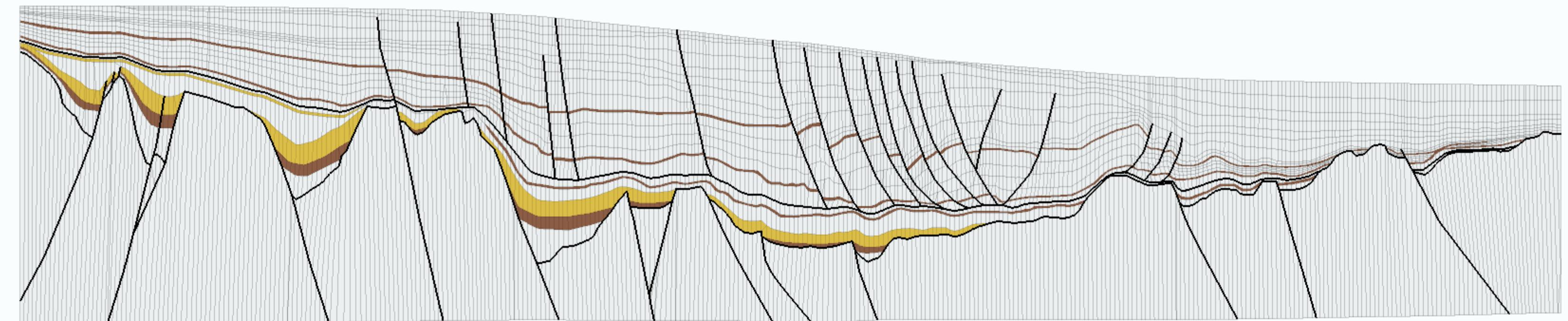
A New Kinematic Tool for PSM in Structurally Complex Margins



Source Rock Maturity

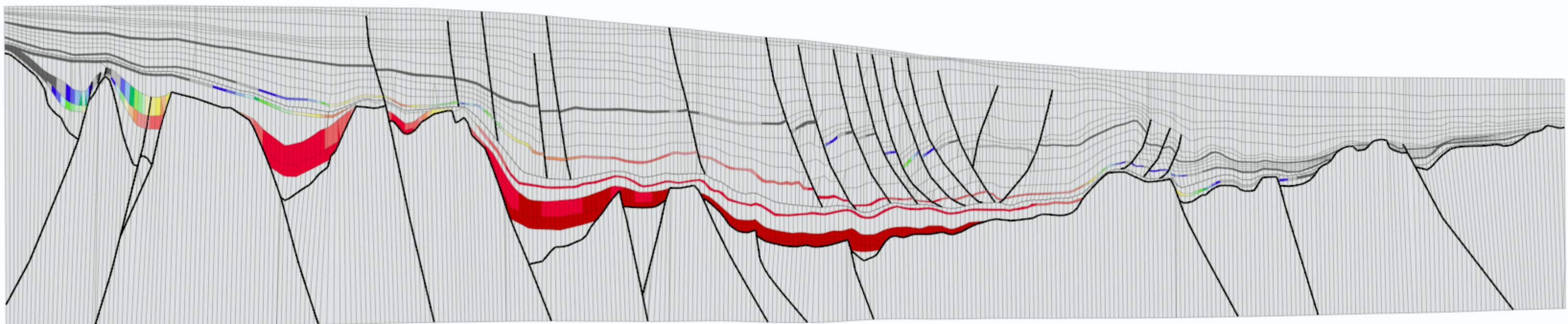
6.5 Ma

KEROGENS



Type III – Are – HI 350
Type III – Are – HI 150

TRANSFORMATION
RATIO



Vertical Exaggeration x4

41

50 km

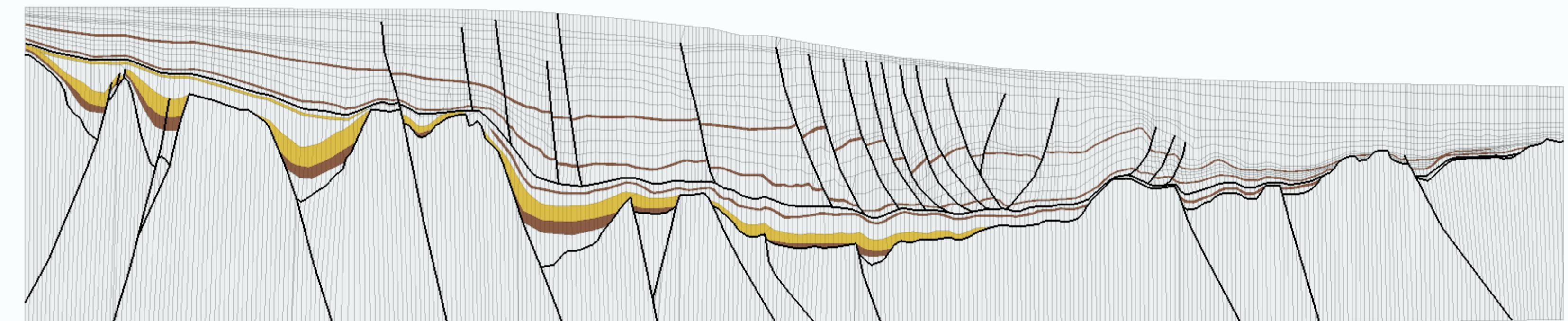
Transformation Ratio (%)
0 20 40 60 80 100



Source Rock Maturity

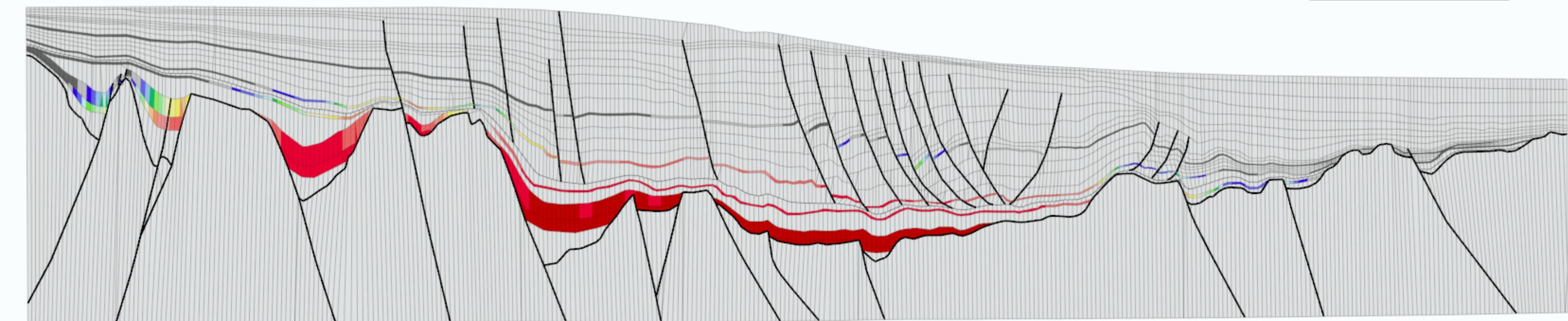
3 Ma

KEROGENS



Type III – Are – HI 350
Type III – Are – HI 150

TRANSFORMATION
RATIO



Vertical Exaggeration x4

25

50 km

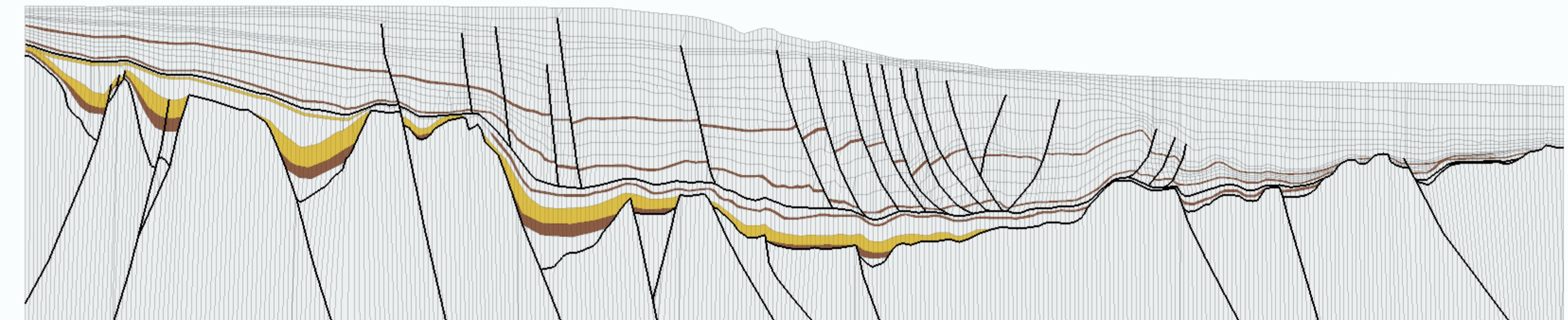
Transformation Ratio (%)
0 20 40 60 80 100



Source Rock Maturity

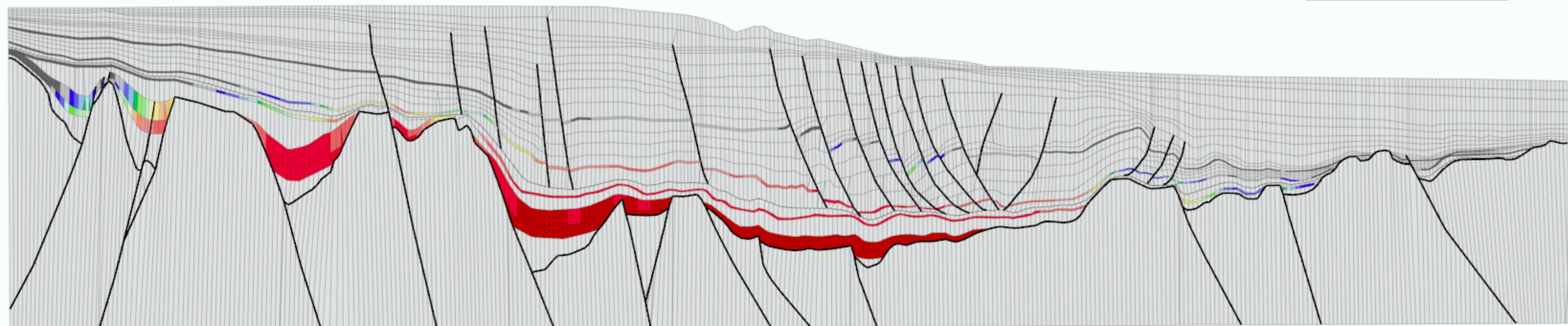
0 Ma

KEROGENS



Type III – Are – HI 350
Type III – Are – HI 150

TRANSFORMATION
RATIO



Vertical Exaggeration x4

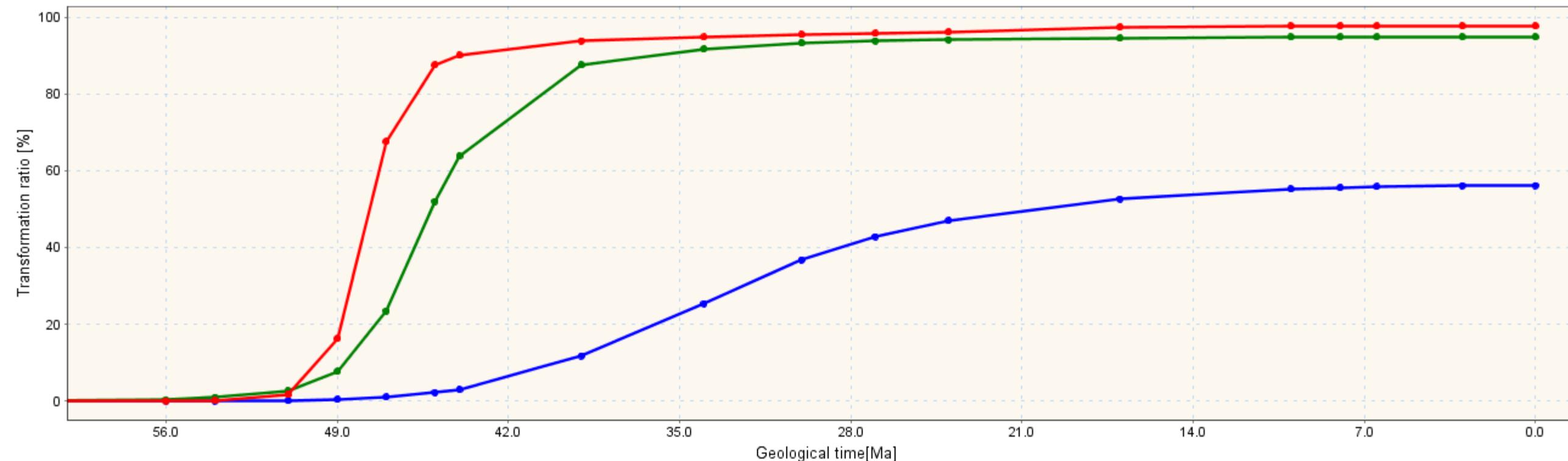
50 km

43

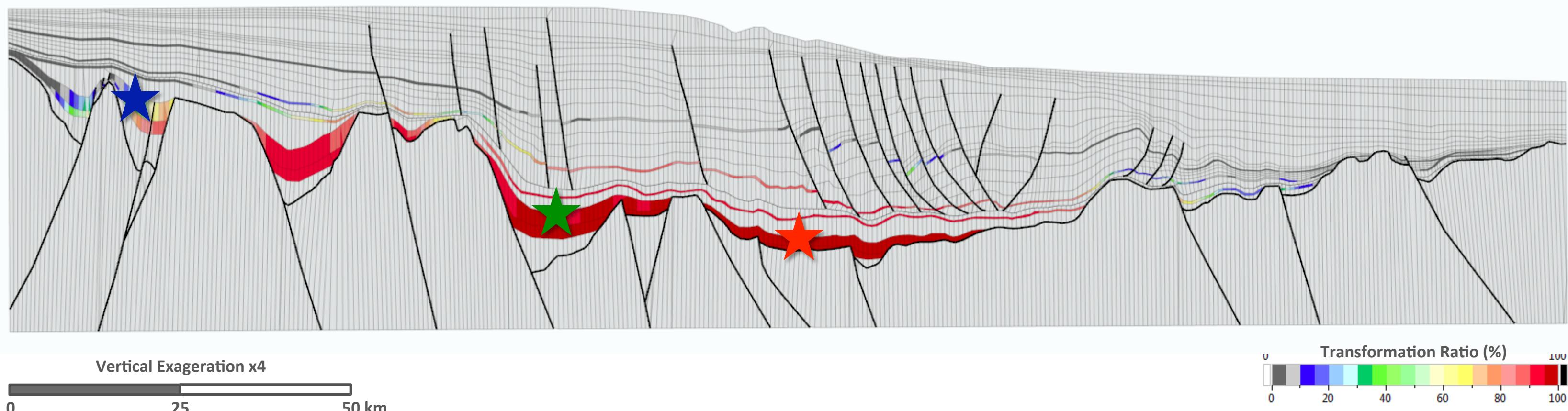
Transformation Ratio (%)
0 20 40 60 80 100



Source Rock Maturity



TRANSFORMATION
RATIO





PORE PRESSURE REGIME



Fault Behavior

■ Two scenarios are tested:

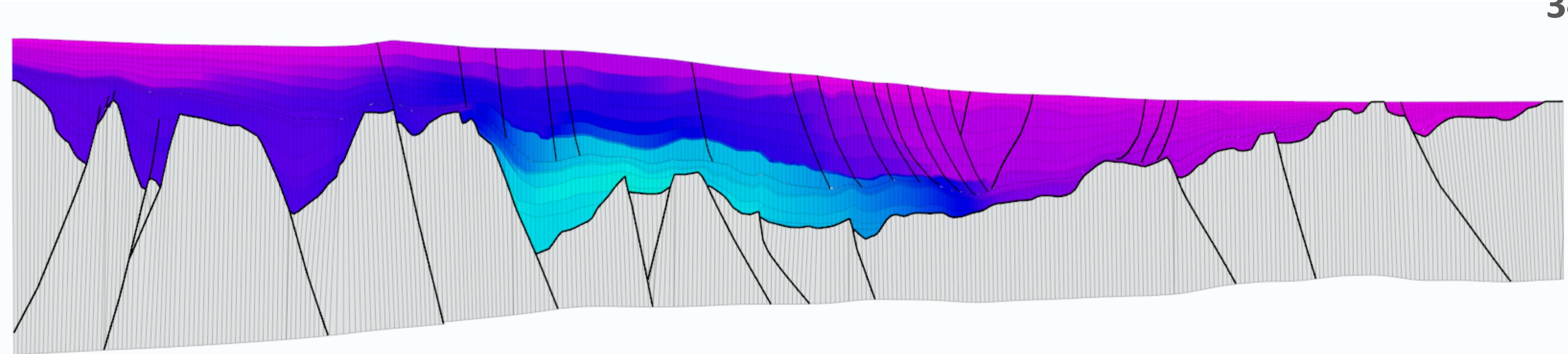
1. One where the faults remain « **transparent** » through time.
 - Their behavior therefore just depends on the evolution of the units in contact as the faults move.
2. A second one where the faults become **impermeable** when the faults are active.
 - No flow is allowed through the faults from 34Ma.



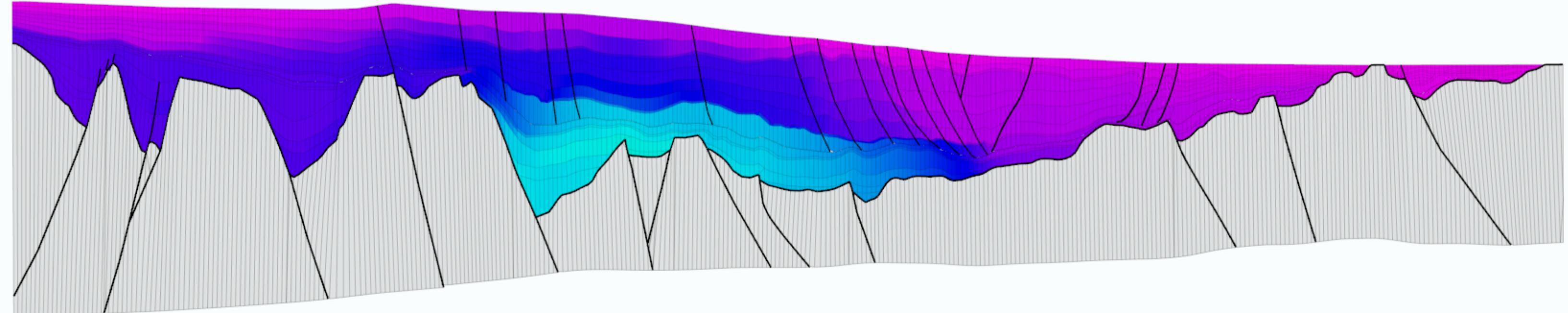
Water OverPressure Regime

34 Ma

TRANSPARENT
FAULTS

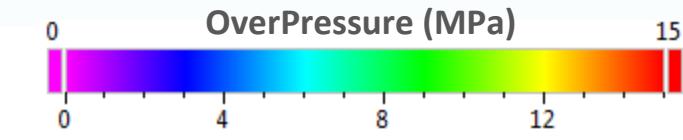


IMPERMEABLE
FAULTS



Vertical Exaggeration x4

0 25 50 km

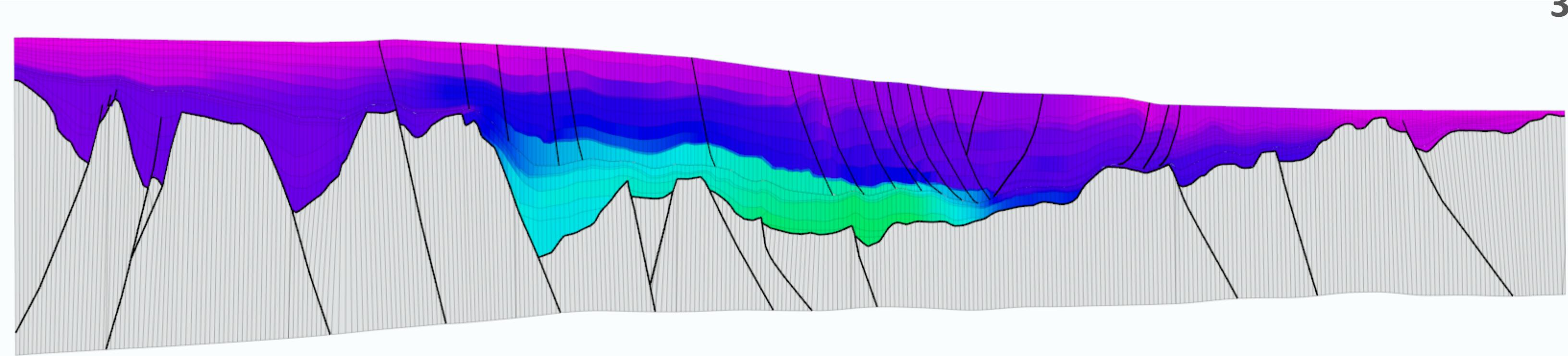




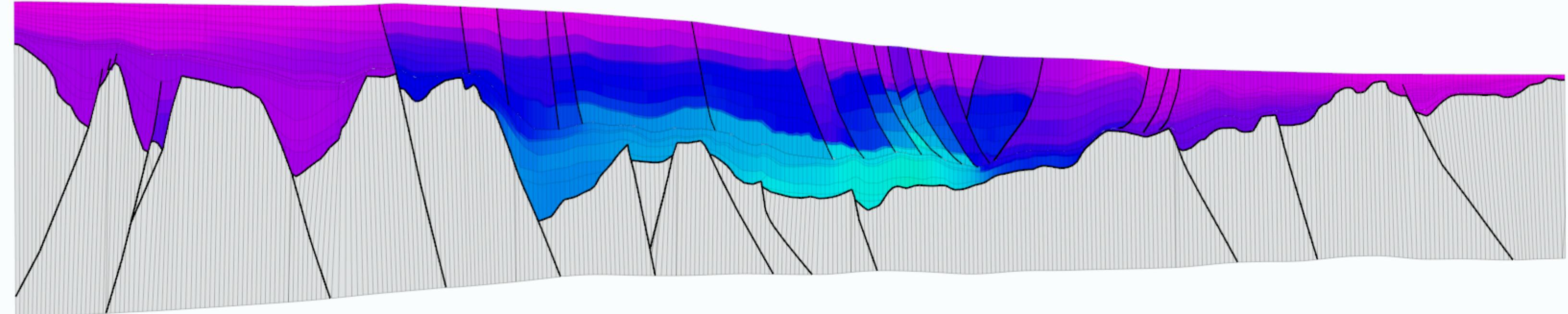
Water OverPressure Regime

30 Ma

TRANSPARENT
FAULTS

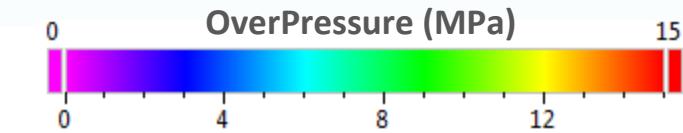


IMPERMEABLE
FAULTS



Vertical Exaggeration x4

0 25 50 km

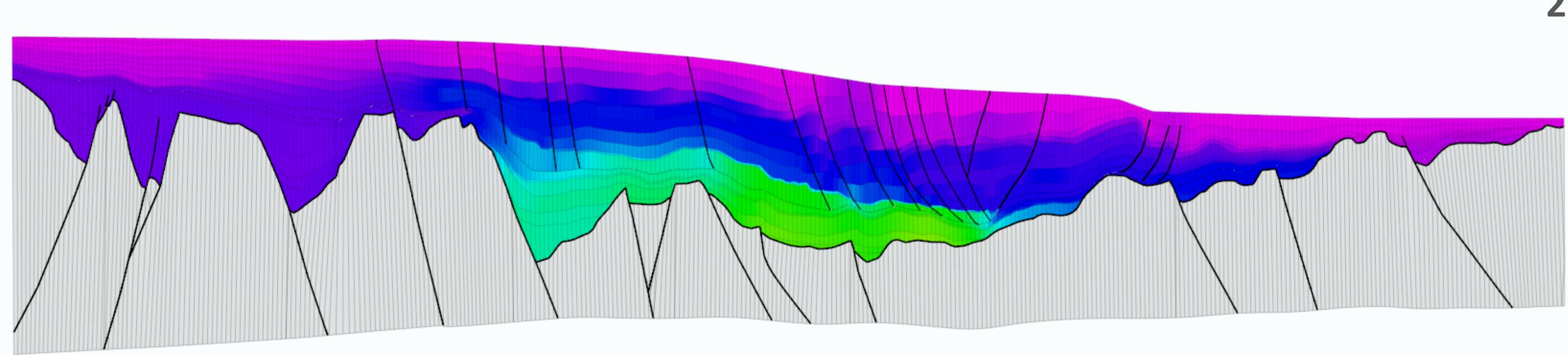




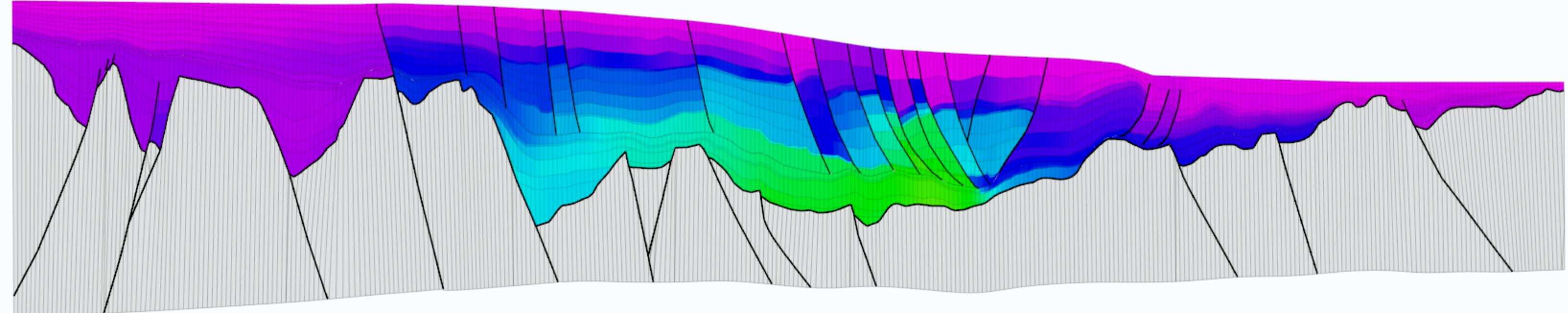
Water OverPressure Regime

27 Ma

TRANSPARENT
FAULTS

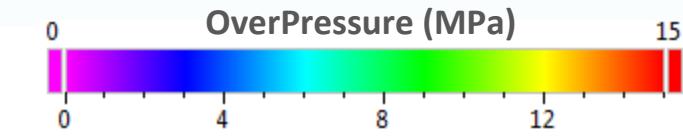


IMPERMEABLE
FAULTS



Vertical Exaggeration x4

0 25 50 km

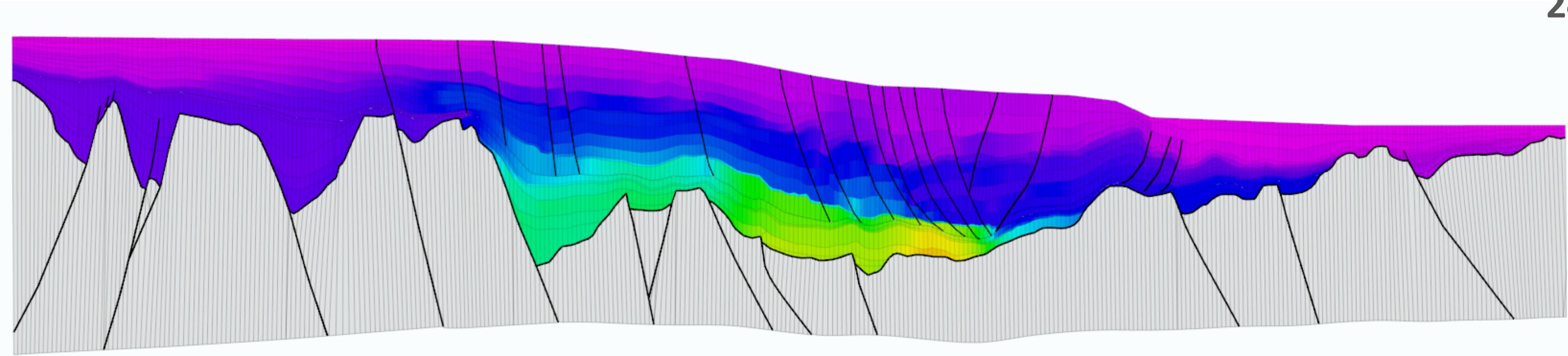




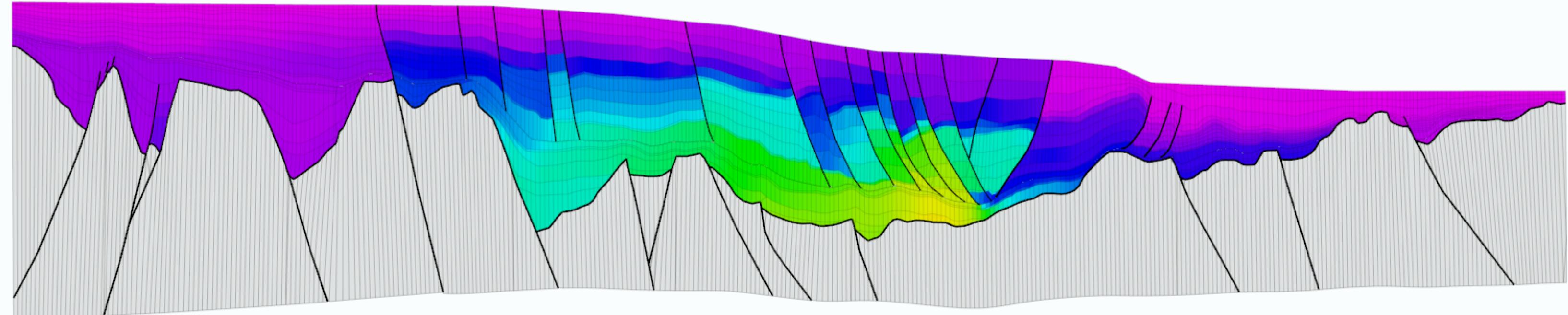
Water OverPressure Regime

24 Ma

TRANSPARENT
FAULTS

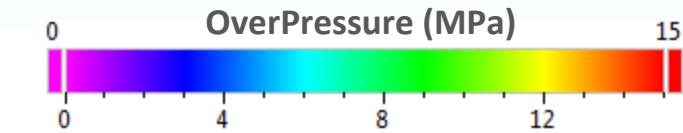


IMPERMEABLE
FAULTS



Vertical Exaggeration x4

50 0 25 50 km



A New Kinematic Tool for PSM in Structurally Complex Margins