

Geology and seabed resources in the South China Sea: a Malaysian perspective

Mazlan Madon
 Petronas E&P Technology Centre, Kuala Lumpur, Malaysia
 Member of the Commission on the Limits of the Continental Shelf

International Seminar on the Extended Continental Shelf and Seafloor Resources, Tokyo, Japan, 10th Jan 2013

Disclaimer

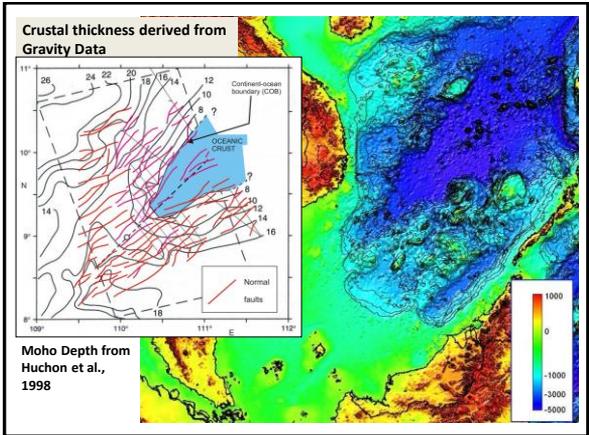
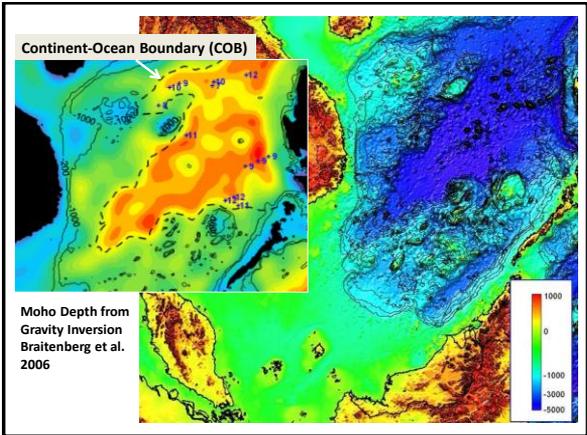
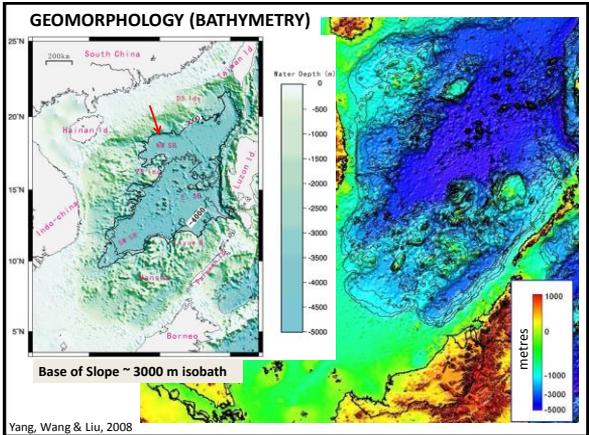
The views expressed in this document and in the presentation are solely those of the author and do not necessarily reflect the views of the Commission on the Limits of the Continental Shelf or PETRONAS or any other parties.

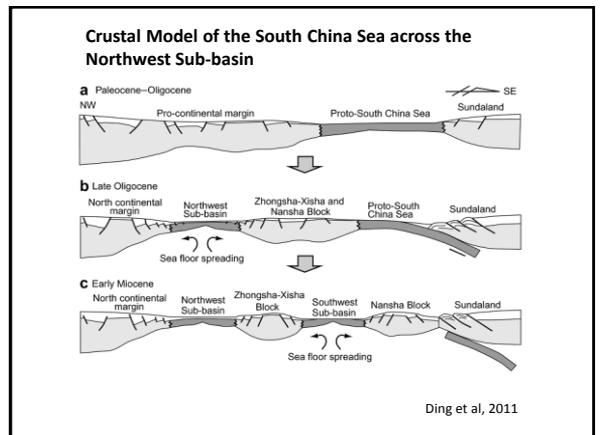
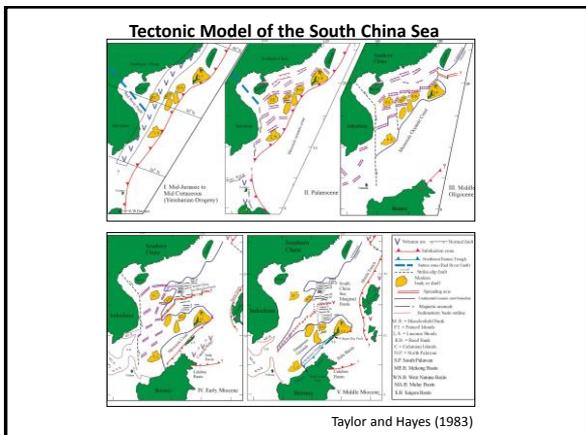
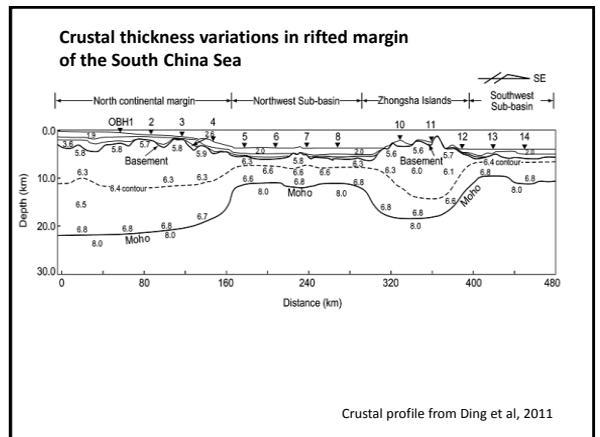
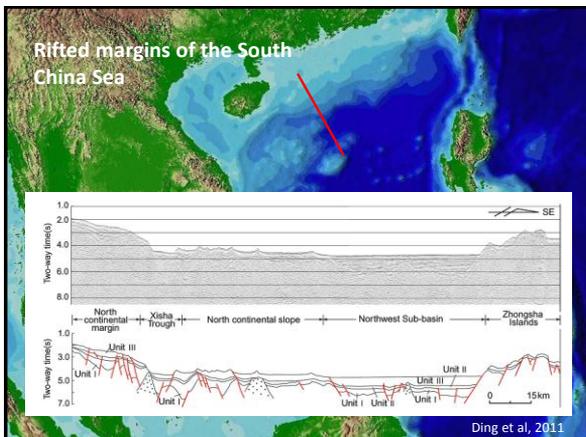
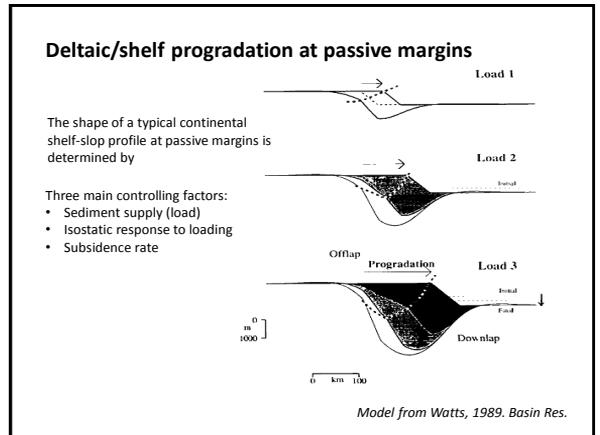
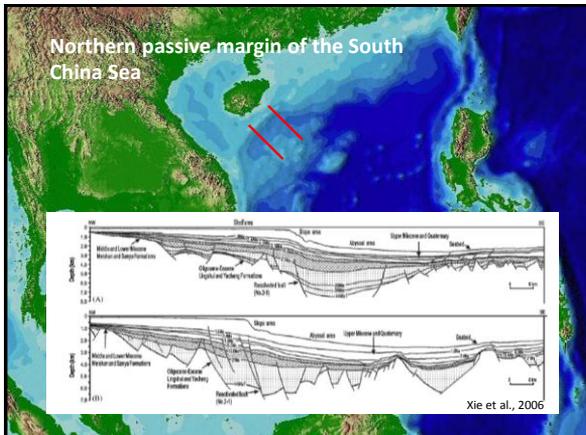
International Seminar on the Extended Continental Shelf and Seafloor Resources, Tokyo, 10th Jan 2013

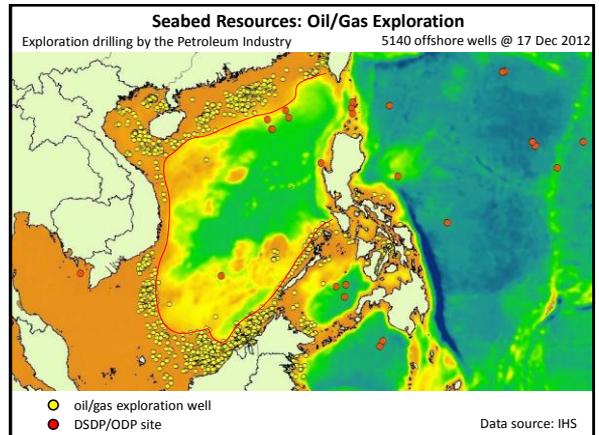
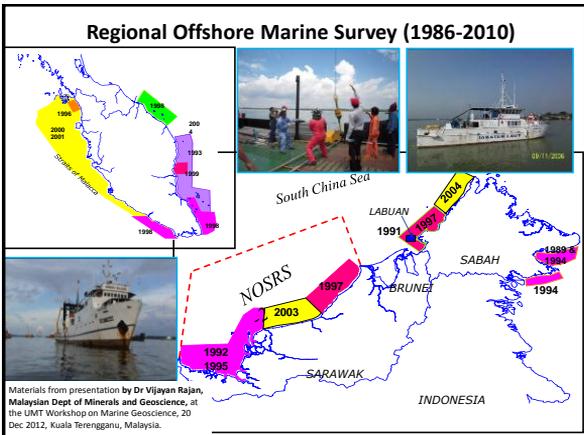
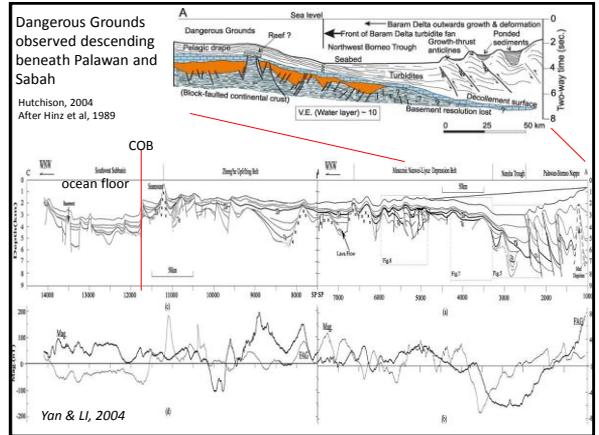
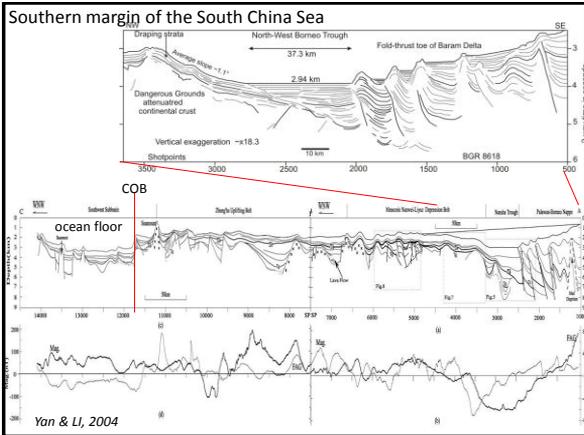
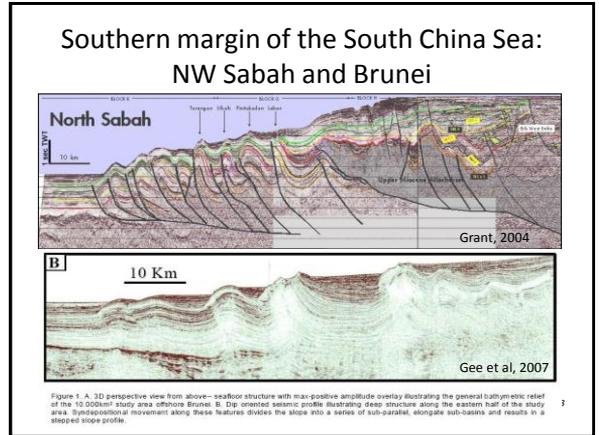
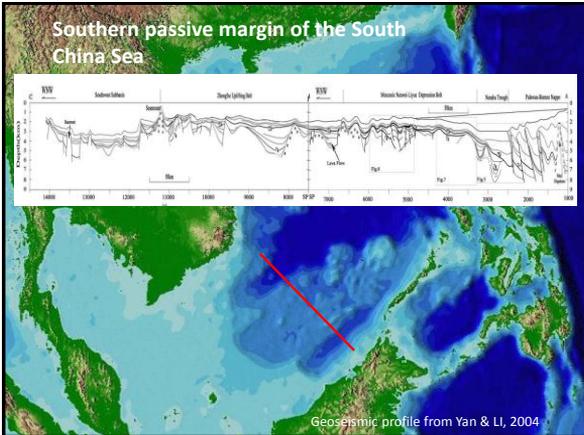
Geology and seabed resources of the South China Sea: a Malaysian perspective

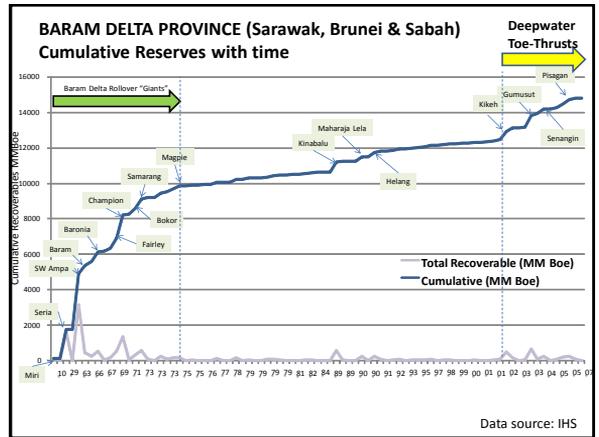
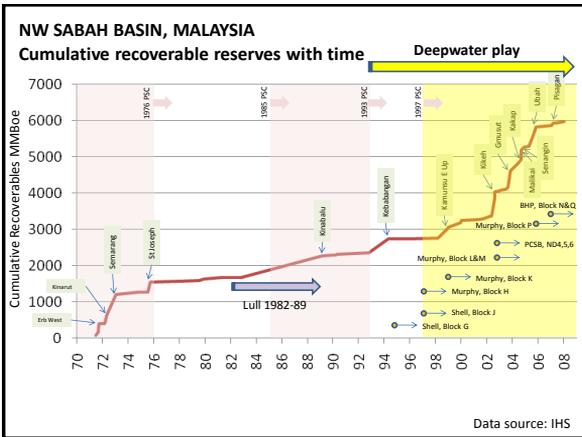
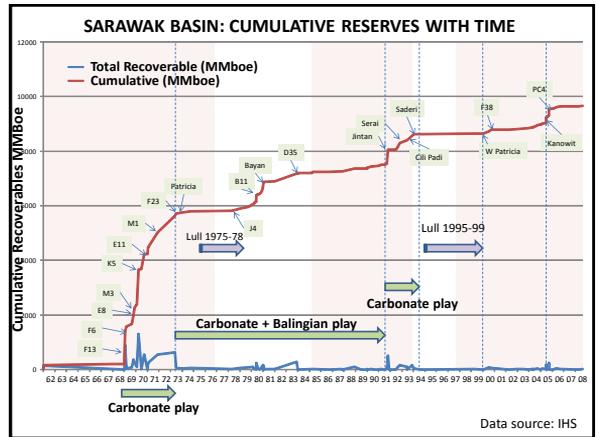
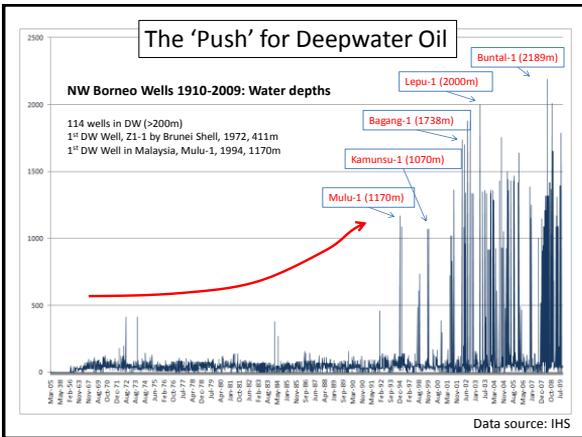
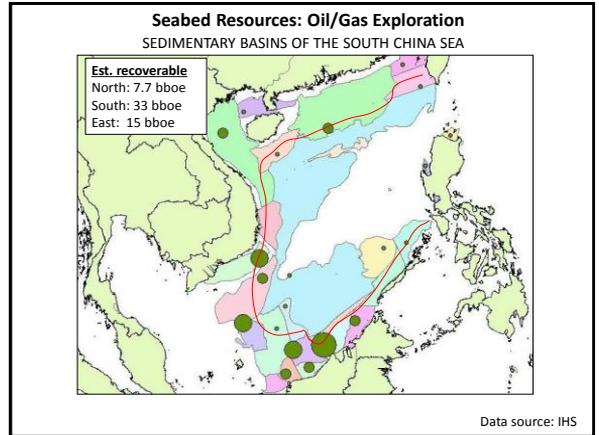
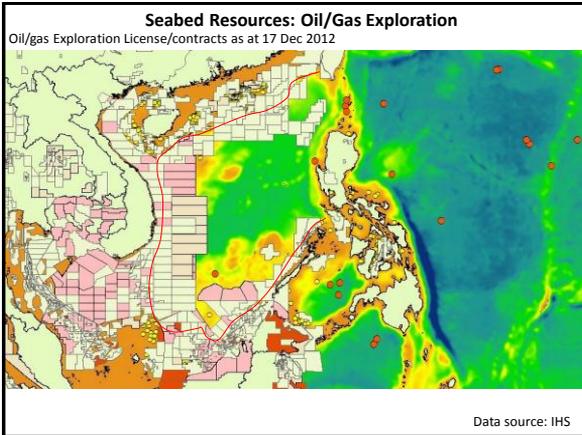
- Geology and Geomorphology
 - Northern/Southern margins
 - Tectonic Evolution
- Seabed resources activities: Malaysian perspective
 - Regional Offshore Marine Survey (1986-2010)
 - Conventional hydrocarbons – from Shelf to Deepwater
 - Unconventionals (e.g. methane hydrates)

International Seminar on the Extended Continental Shelf and Seafloor Resources, Tokyo, 10th Jan 2013









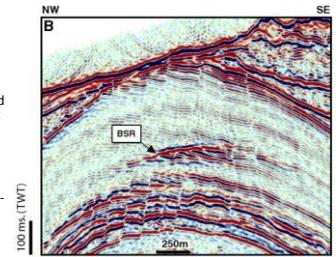
Unconventional Hydrocarbons

- Methane (Gas) hydrates
 - Gas/methane 'trapped' in ice/water molecule lattice at low temperatures
 - 98% occurrences are in 300-3000m (outer shelf and slope), 2% in continental permafrost
 - Global estimate (Johnson, 2011) – 43,000 TCF
 - Energy of the future (?)

International Seminar on the Extended Continental Shelf and Seafloor Resources, Tokyo, 10th Jan 2013

Sabah/Brunei margin: Gas hydrates

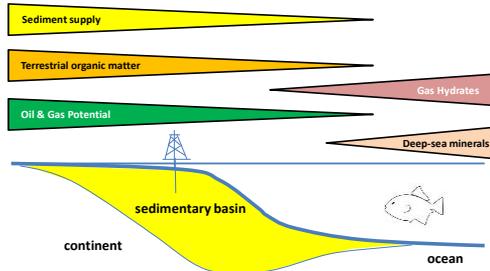
- Initial reports by BGR (late 1980s) but hardly any detailed study done; some description published (Gee et al., 2007)
- Hydrate occurrences associated with the deepwater fold-thrust anticlines offshore NW Sabah and Brunei, indicated by Bottom-Simulating Reflectors (BSR), in post-Miocene sediments 250-300 m beneath sea floor, in water depths 1100-2800 m.
- Future work needed: Volumetric Assessment and Exploitation technology



Deepwater Brunei (Gee et al., 2007)

International Seminar on the Extended Continental Shelf and Seafloor Resources, Tokyo, 10th Jan 2013

CONTINENTAL MARGINS AND SEABED RESOURCES



Concluding remarks

- Geology, margin type, and **seabed geomorphology** closely related to crustal thickness (rifting history)
- **Sediment thickness** controlled by nature of basement and/or crustal thickness (therefore, margin type)
- **Seabed resources**: type (hydrocarbons or metallic minerals) and potential/risks depend on these inter-related factors (geology)
- **Seabed resource activities for Malaysia**: mainly oil/gas exploration on shelf/slope; nearshore sand and mineral exploration

International Seminar on the Extended Continental Shelf and Seafloor Resources, Tokyo, 10th Jan 2013

Thank you