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## Recent Developments in Stratigraphic Forward Modelling

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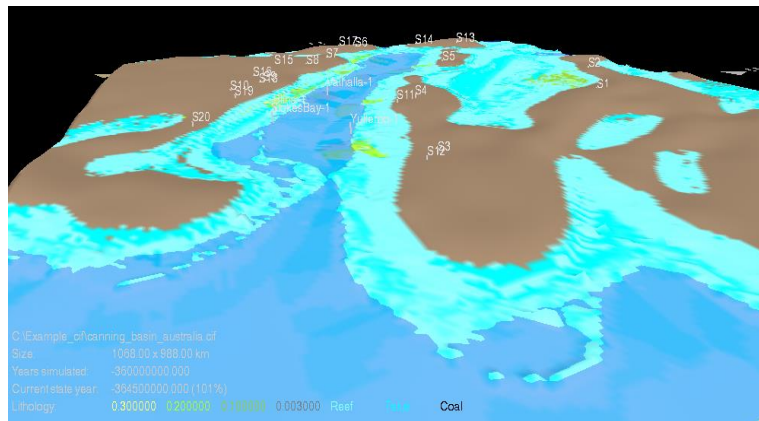
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Stratigraphic forward modelling (SFM) technology continues to evolve and find new applications in environmental and subsurface prediction and hypothesis testing.

Stratigraphic forward modelling is the application and numerical testing of our understanding of sedimentation and preservation processes at spatial resolutions from centimeters to kilometers and time intervals of seconds to millions of years, in three dimensions. Most modern laptops have the power to model many millions of years of stratal evolution within a basin at high resolution within a few hours. This enables rapid testing of multiple working hypotheses of basin evolution.

Examples are shown of applications in ‘conventional’ and ‘unconventional’ hydrocarbon exploration, geological sequestration of CO<sub>2</sub>, and climate change scenario modelling.

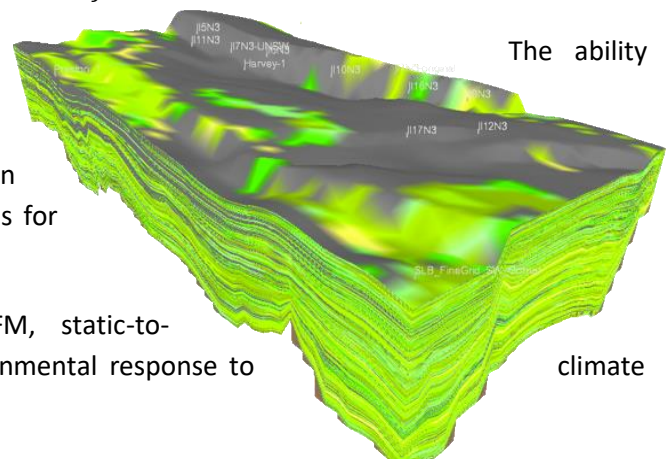


Most complex interactions of sedimentary environments can now be modelled at high resolution. Interactions between siliciclastic, carbonate, organic, aeolian processes can all be predicted as a function of changes in accommodation, sediment supply, climate, wind, waves, currents, and extreme events.

*Figure 1: Stratigraphic forward model of the Devonian reef system, Canning Basin, WA, Australia*

to use multiple resolutions in a single simulation means that rapid testing of basin-scale processes can occur simultaneously with high-resolution prediction of rock properties at discrete locations for comparison with observations.

New developments in synthetic seismic from SFM, static-to-dynamic reservoir model generation, and environmental response to change are discussed.



*Figure 2: Stratigraphic forward model of Triassic strata, Perth Basin, WA, Australia for geological sequestration of CO<sub>2</sub>.*

*References:*

[1] Huang, X., Griffiths, C. M., & Liu, J., 2016. Recent Development In Stratigraphic Forward Modelling and its Application in Petroleum Exploration, Australian Journal of Earth Sciences, DOI: 10.1080/08120099.2015.1125389

