Sedimentary Modelling of a Permian Kookfontein Shelf-Edge Delta, Tanqua-Karoo Basin (South Africa)

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Tanqua-Karoo depocenter (SW Karoo Basin)
Project Motivation

Geological (Reservoir) Model

Facies variability
Sedimentary heterogeneities
1D/2D/3D Models

Erroneous NTG:

Prospect evaluation
Fluid flow prediction
Recovery techniques

Subsurface:
Stochastic (i.e. probabilistic)
Low resolution

VS

Outcrop:
Deterministic
3D exposure
High resolution
Project Motivation: Previous work/Objective

- Detailed studies on the deltaic system (i.e. Kookfontein Formation) includes: Wild, 2005; Green, 2009

- Yet to be fully constrained about the deltaic sequence includes:
  a) Sediment stacking and dominant depositional controls
  b) Type

Research Objective:
To reconstruct Kookfontein depo-system through deterministic/hierarchical-based sedimentological models

Map of Tanqua depocentre (courtesy of GSSA)
Methodology: Dataset

- 4 VS representing 1120 m profiles
- 2 total-count GR logs
- 15 samples for thin section/SEM
- 2 ground-based photo mosaics
Methodology: Project Workflow

- Observed sedimentary features
- Basinward facies correlation
- 1D/2D/3D Facies models
- Hydrodynamic interpretations
- Description of internal architecture/geometry
Hypothesis for 2D/3D Models

Each clinothem is deposited by:

1) Primary mouthbar stream flow dynamics
2) Secondary remobilisation under gravity effects
Principal conclusion:

- The depo-system is interpreted to be a river-dominated, gravitationally reworked and wave-influenced shelf-edge Gilbert-type delta.
Proposal for 3D Basin Analysis and Petroleum System Characterisation/Modelling of Western Bredasdorp Basin, Offshore South Africa

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Western Bredasdorp Basin, off the south coast of SA
**Problem identification:**
• Shelf or Slope?
• Depositional architectures?
  ➢ Shelf/Shelf margin/Slope deposits
  ➢ Fluvial/Delta/Turbidite
• Insufficient petroleum system models

**Objectives:**
• To reconstruct basin evolution history so as to determine factors responsible for stratigraphic patterns and sedimentary heterogeneities
• To develop petroleum system workflow for improved reservoir characterisation

**Methodology workflow**
- Integrated seismic, well-log & outcrop data interpretations
- 3D Basin model
- 3D Facies model
- Accurate prediction of petroleum system elements
- Improved reservoir characterisation/modelling

**Deliverables**
• 3D basin and facies models
• Increased understanding of existing prospectivity models
THANK YOU FOR LISTENING