# Exploring the Jurassic Carbonate Platform Margin, Majunga Basin, Madagascar

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**ABSTRACT:**

The onshore Majunga basin covers about 35,000 km² in northwest Madagascar and extends offshore. Above the Permo-Triassic Karoo rift complex, basin sedimentary fill includes a Jurassic section with Liassic organic-rich shale and a Dogger carbonate platform, overlain by Cretaceous marine sandstone and shale. Seven deep wells, including two offshore, had failed to test the Dogger limestone paleo-shelf edge. In 1998, Hunt Oil Company obtained a PSC covering the onshore basin and carried out field work, photogeology, Landsat mapping, and seismic reprocessing of 1983-1992 data.

Excellent Jurassic marine source rocks updip of the platform margin contained TOC's of 10 to 23%. Modeling of downdip shale, of unknown source quality, showed maximum oil generation would have occurred in the Late Cretaceous. Dogger shelf-margin facies, capped by Upper Jurassic and Cretaceous shale, were in structurally high positions at that time, providing excellent trap geometry. Reprocessed seismic showed an area of anomalous high amplitude running parallel to the Jurassic shelf edge, and acoustic impedance inversion suggested high probability of significant porosity development. Post-Jurassic basinward tilting precluded structural closure, but a large porosity-pinchout trap was indicated. In 2000, the Belobaka-1 was drilled to 9,520 ft (2,901.7 m), encountering 183 ft (56 m) of water-bearing Dogger oolitic limestone with 12 to 22% porosity. A technical success, the well demonstrated the presence of reservoir-quality porosity at the bank margin, but the absence of hydrocarbons suggests either poor source facies downdip or an inadequate porosity seal in the carbonate rocks.

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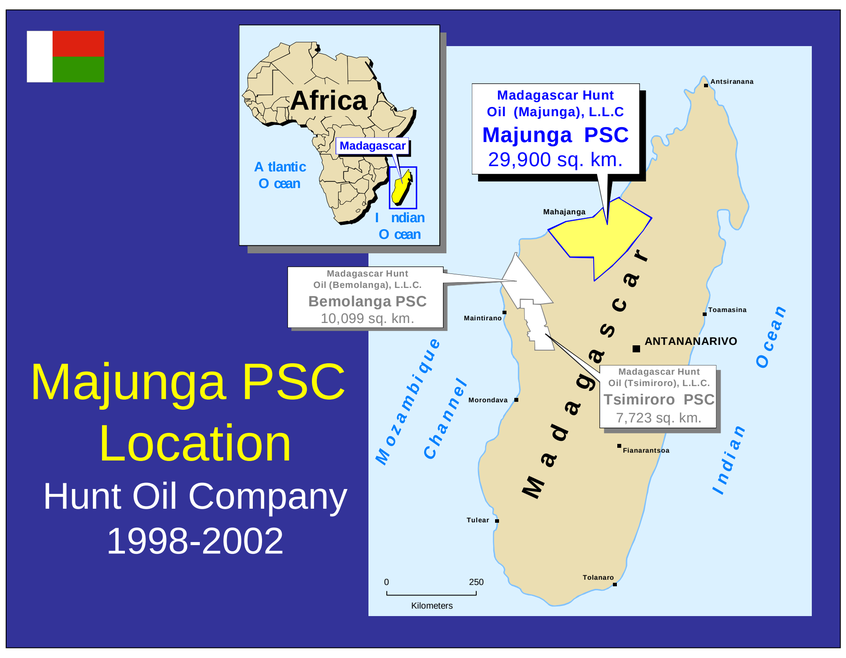
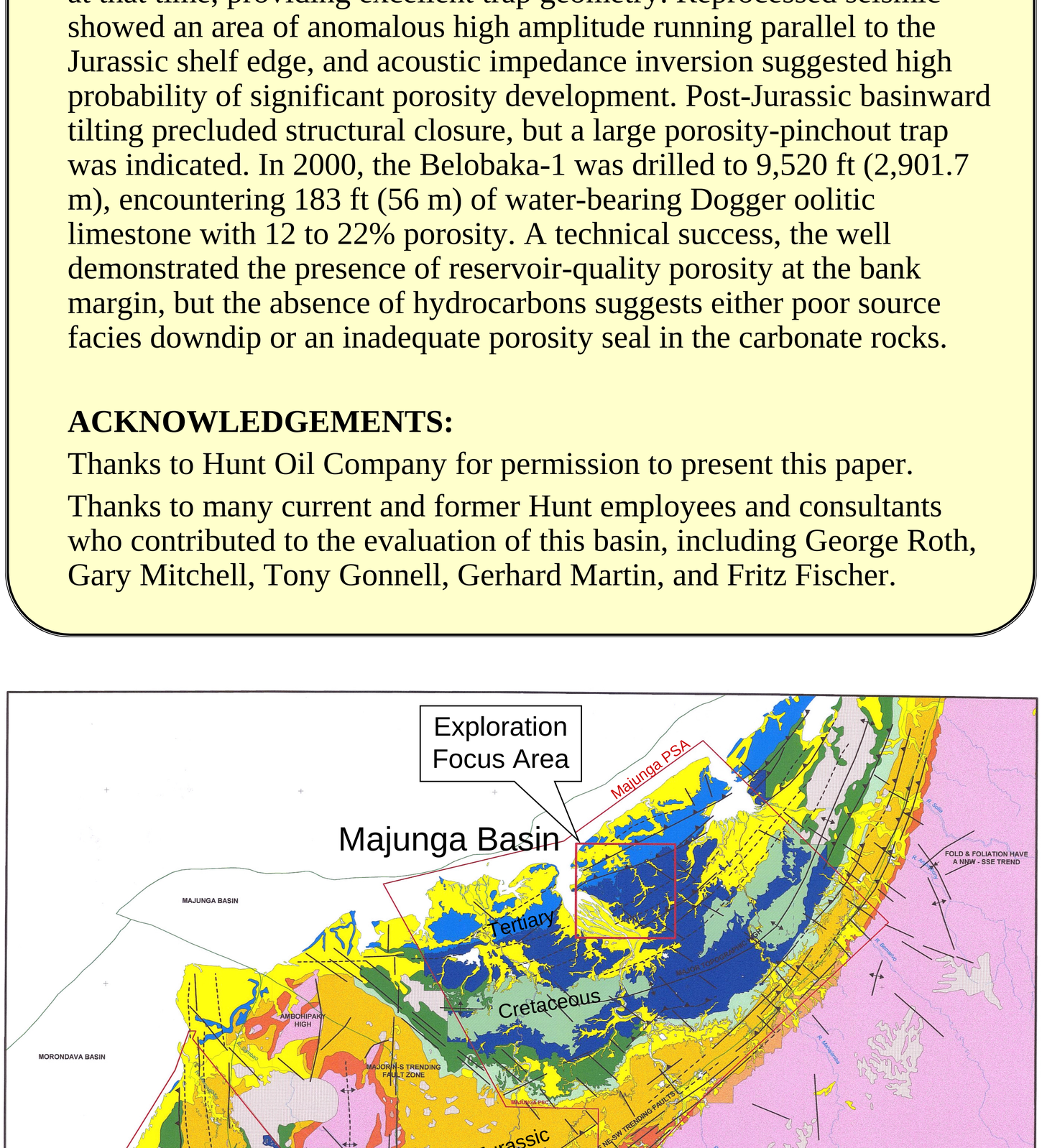



## Majunga Exploration History (Onshore/Nearshore)

- 1950-1968: S.P.M.
  - Aeromag and Gravity
  - Seismic- 1,500 km, 1 to 6 fold
  - 2 Wells- Ihopy 1 & Tuiliere 1
    - Invalid prospects
    - Mesozoic tests
- 1968-1975
  - Conoco
    - Seismic- 185 km, poor quality
    - 1 Well (Sophia 1)- Mid-Jurassic and Karoo test.
  - AGIP (shallow offshore)
    - Seismic- 6,500 km; poor quality
    - 2 Wells: Mariarano 1 & Mahajamba 1
      - Mesozoic tests
- 1975: Nationalization. OMNIS created
- 1983-1985: AGIP
  - Coastal zone seismic- 1,300 km, poor quality
- 1988-1992: Shell
  - Reprocessed 1,585 km gravity
  - Seismic- 4,906 km, fair to good quality
  - 2 Wells (Marovoay 1 & Ankara 1)
    - Unsuccessful; Karoo objectives
- 1998-2002: Hunt Oil Co.
  - Reprocessed >1,000 km seismic
  - 1 Well (Belobaka 1), Jurassic test.




## Majunga Basin Geologic Map
### Showing Structure and Stratigraphy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