

EGU2020-22009

<https://doi.org/10.5194/egusphere-egu2020-22009>

EGU General Assembly 2020

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## High resolution imaging of fault reactivation in long-lived extensional setting: a case study from the Exmouth Plateau (NW Australia)

**Nico D'Intino**

Università degli Studi "Gabriele D'Annunzio" di Chieti-Pescara, INGEO, Chieti, Italy ([nico.dintino@unich.it](mailto:nico.dintino@unich.it))

Extension in rift zones and passive margins often occur by multiphase normal faulting which usually accommodates several episodes of lithosphere stretching by brittle deformation. In these settings, pre-existing normal faults may reactivate but also new-formed structures may nucleate, with multiple orientations and deformational styles. The various modes of fault growth and nucleation are strongly influenced by several parameters (including orientation and geometry of pre-existing discontinuities, stress orientation and magnitude, strain rates, confining pressure, etc..) with the lithostratigraphy controlling the brittle or ductile litho-mechanic behavior of each unit.

In this work, we interpreted and analyzed an industrial 3D seismic volume acquired in the Exmouth Plateau, (Northern Carnarvon Basin – offshore NW Australia), where pre-existing Mesozoic normal faults were reactivated during the Cenozoic and controlled the nucleation and growth of the new-formed overlying fault segments. The peculiarity of this system is that the two sets of faults are separated by a ductile interval of shales. The latter acted as decollement level and promoted the formation of prominent faulted anticlines in the overlying brittle sequence; these forced folds are poorly documented in other extensional settings while are common where salt layers are present. In this study, the high-resolution techniques adopted for seismic data interpretation aimed to understand the geometries of faults and their interactions in fine detail. The results of fault analysis suggest that the use of high-quality 3D seismic volumes is very useful to unravel the complex and subtle spatial variability and also the displacement pattern of faults with a limited amount of fault-throw.