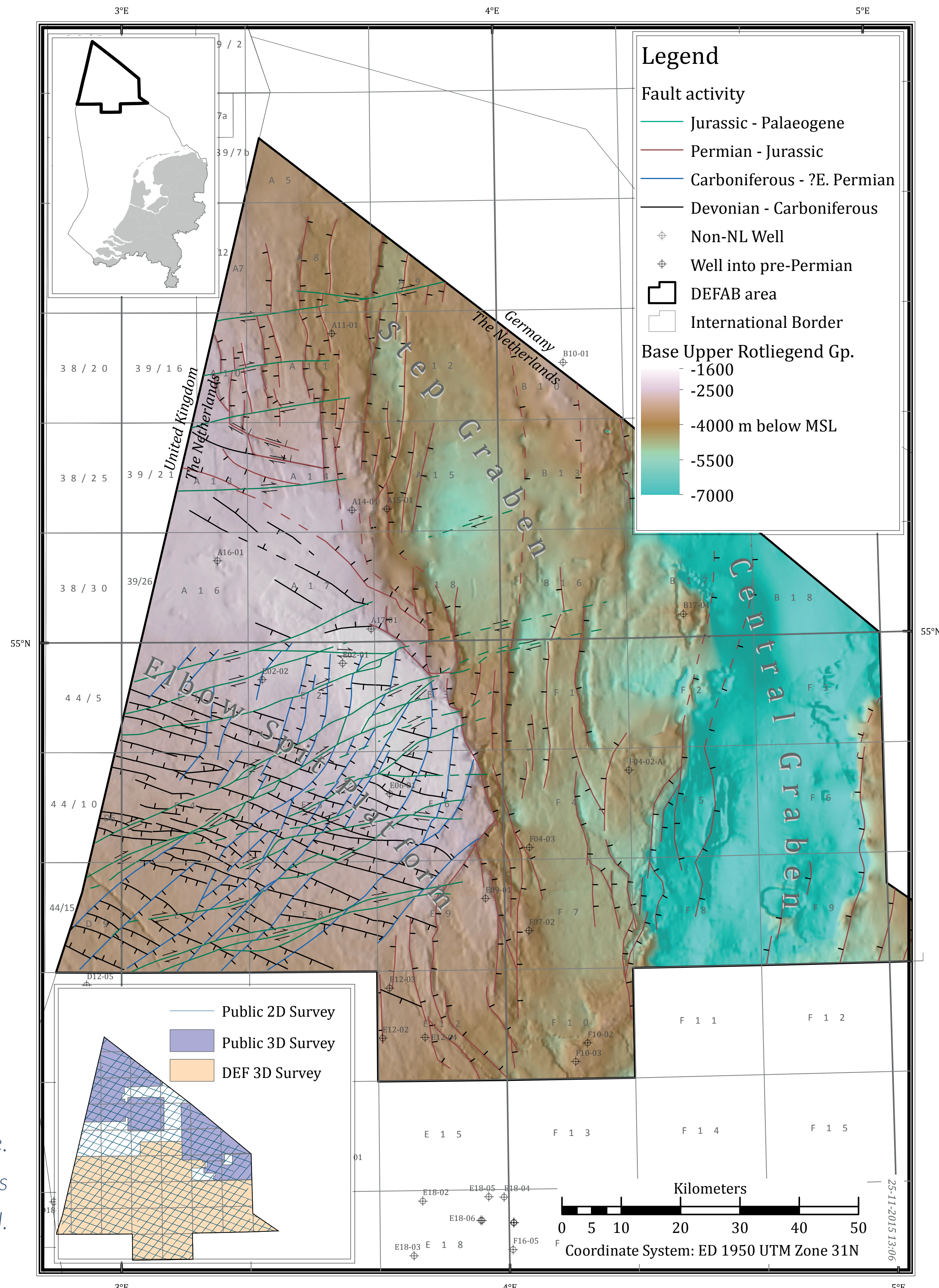


Structural framework of the Mid North Sea area, Palaeozoic to present

- Recent UK gas discoveries north of the proven Rotliegend and Carboniferous fairways have triggered fresh interest in the Mid North Sea area
- New seismic data was used to develop a structural framework for the Dutch part of the area
- The new framework sheds new light on hydrocarbon potential



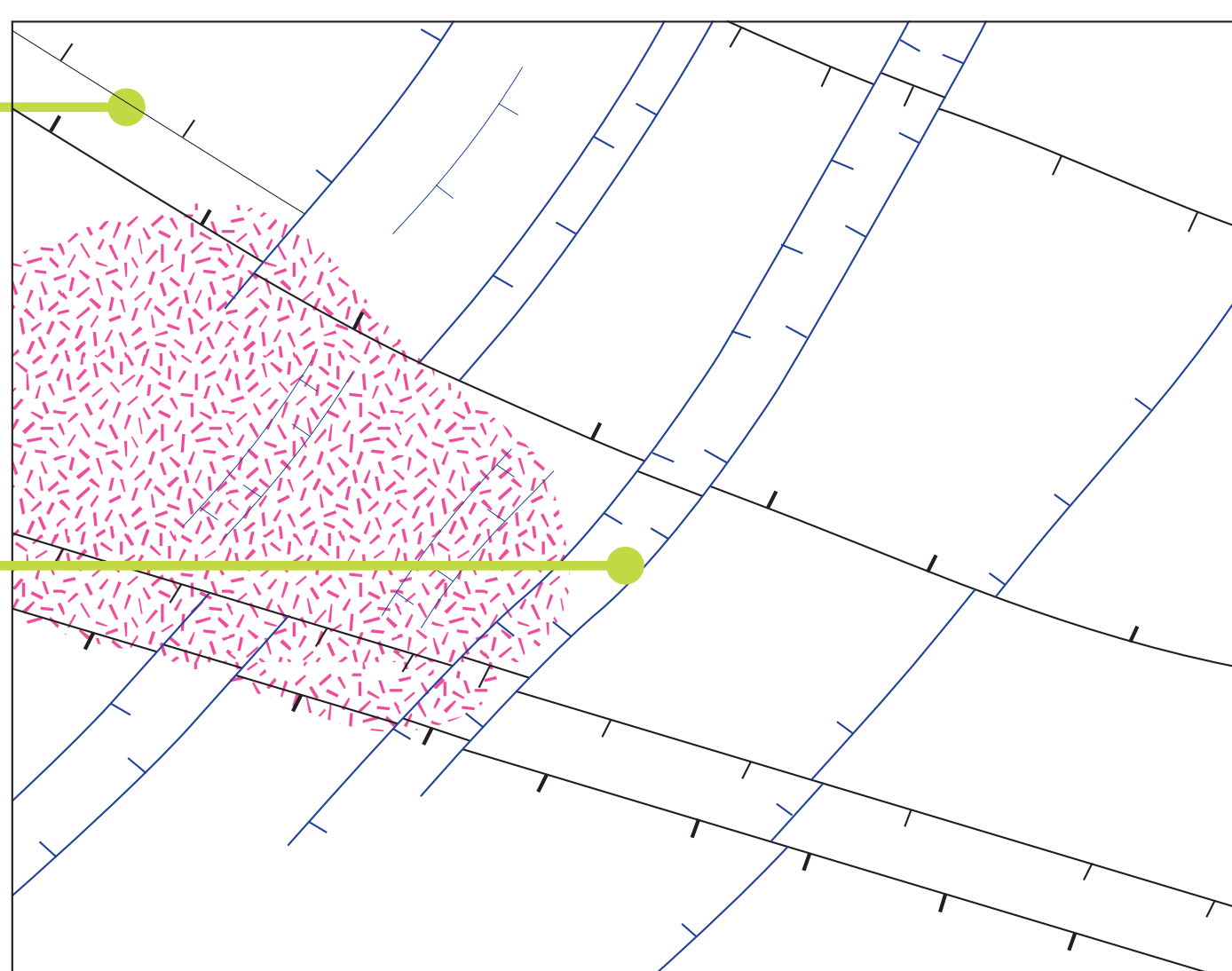
Structural framework for the northern Dutch offshore.
Faults are shown at Base Permian level, except in blocks D9 to E9, where faults are shown at Top-Visean level.

Fault trends

Devonian – Carboniferous

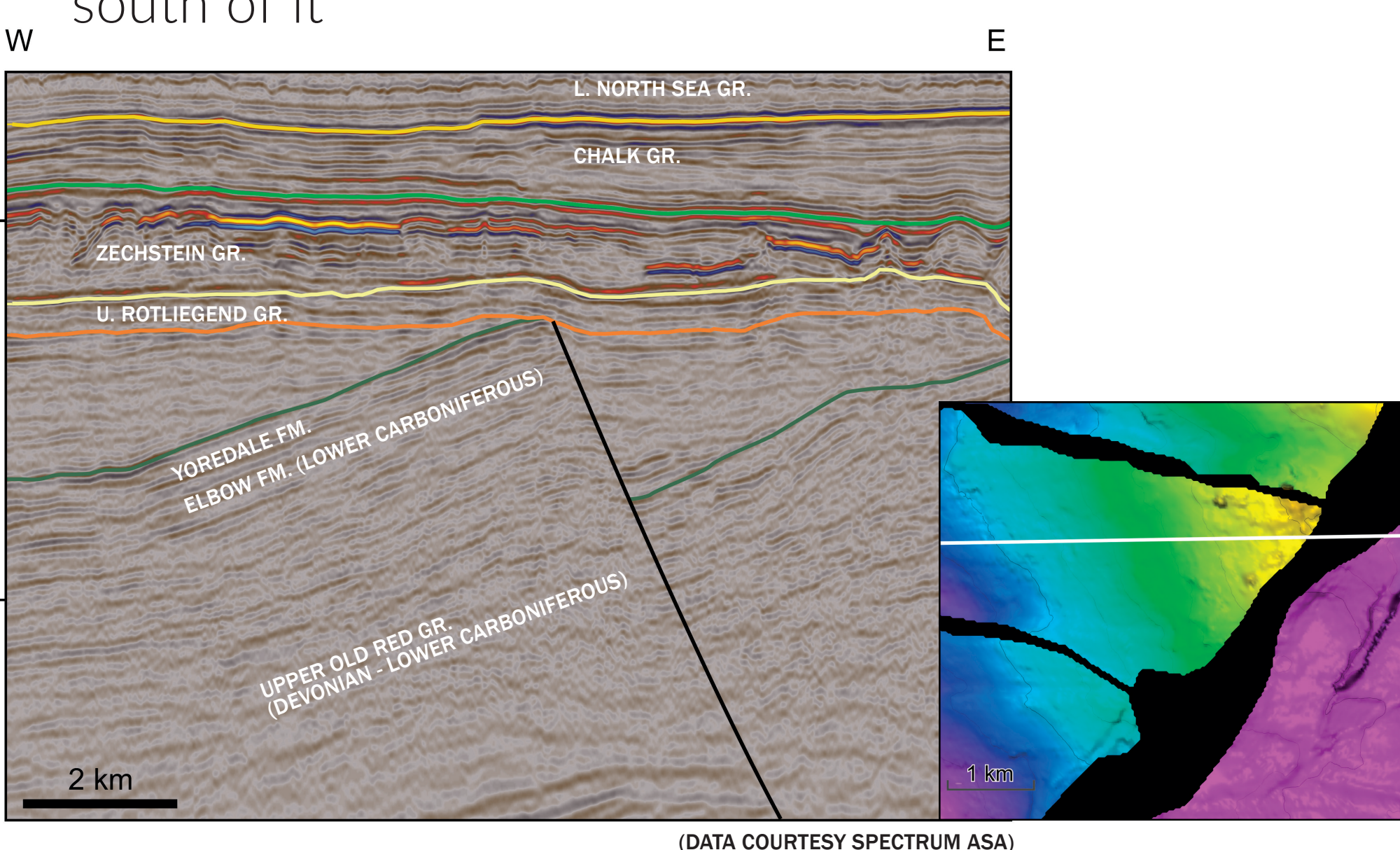
Two clear fault trends:

- N120-trend: mainly Devonian to Early Carboniferous
- N040-trend: post Visean (Early Carboniferous), pre-Upper Rotliegend (Early Permian)
- Normal offset
- Commonly no offset in Permian and younger strata



Relevance of these fault trends:

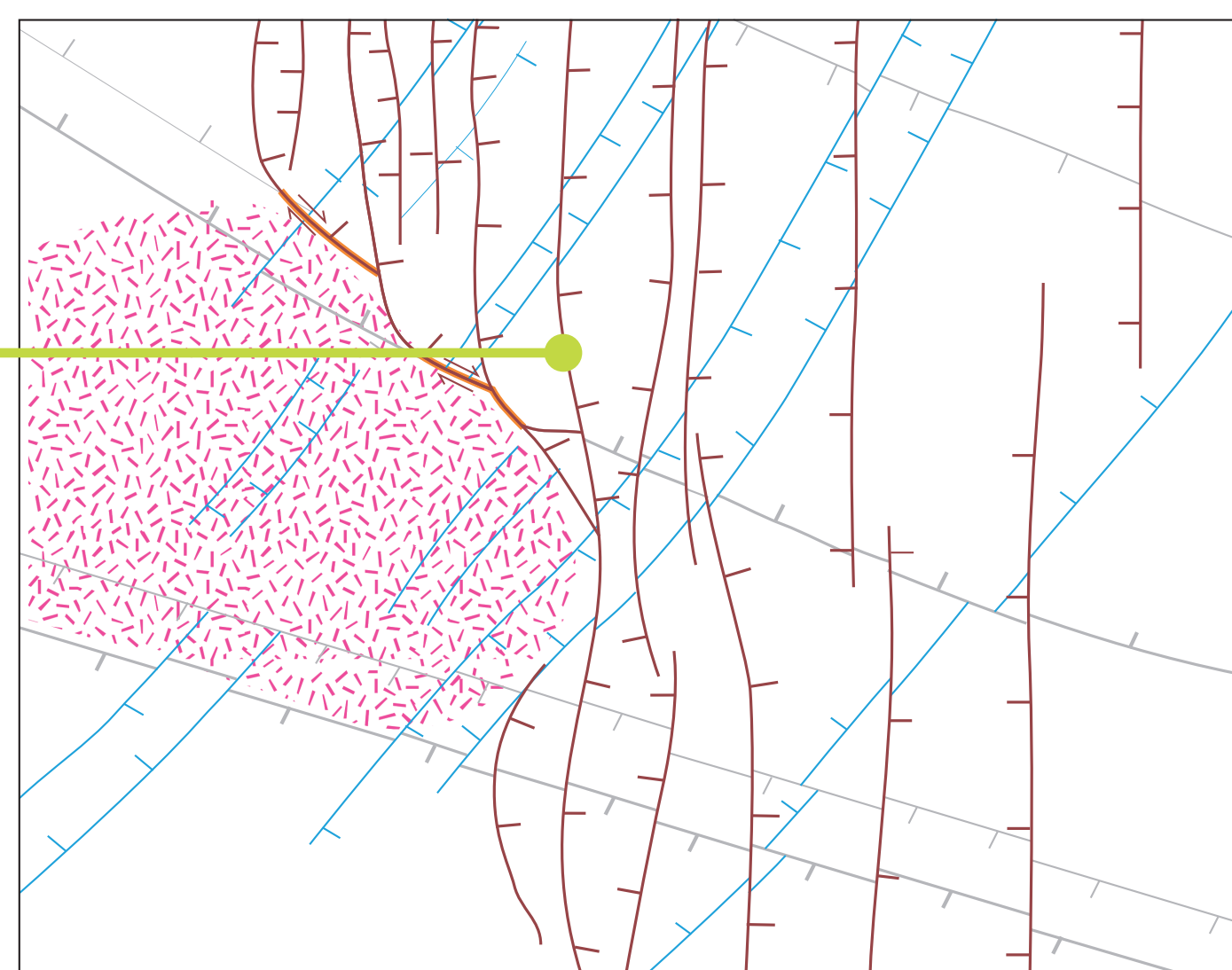
- Trap formation: tilted fault blocks
- Causes compartmentalization by sealing faults, also within fault blocks
- Affects deposition
- Causes large scale alternation of highs and lows such as the Elbow Spit Platform and the lows north and south of it



(Permian) Triassic – Jurassic

Fault trend related to the opening of the Dutch Central Graben and Step Graben.

- N-S trend
- Active primarily during Triassic and Jurassic
- Normal offset
- Deformation less intense on Palaeozoic highs



Relevance of this fault trend:

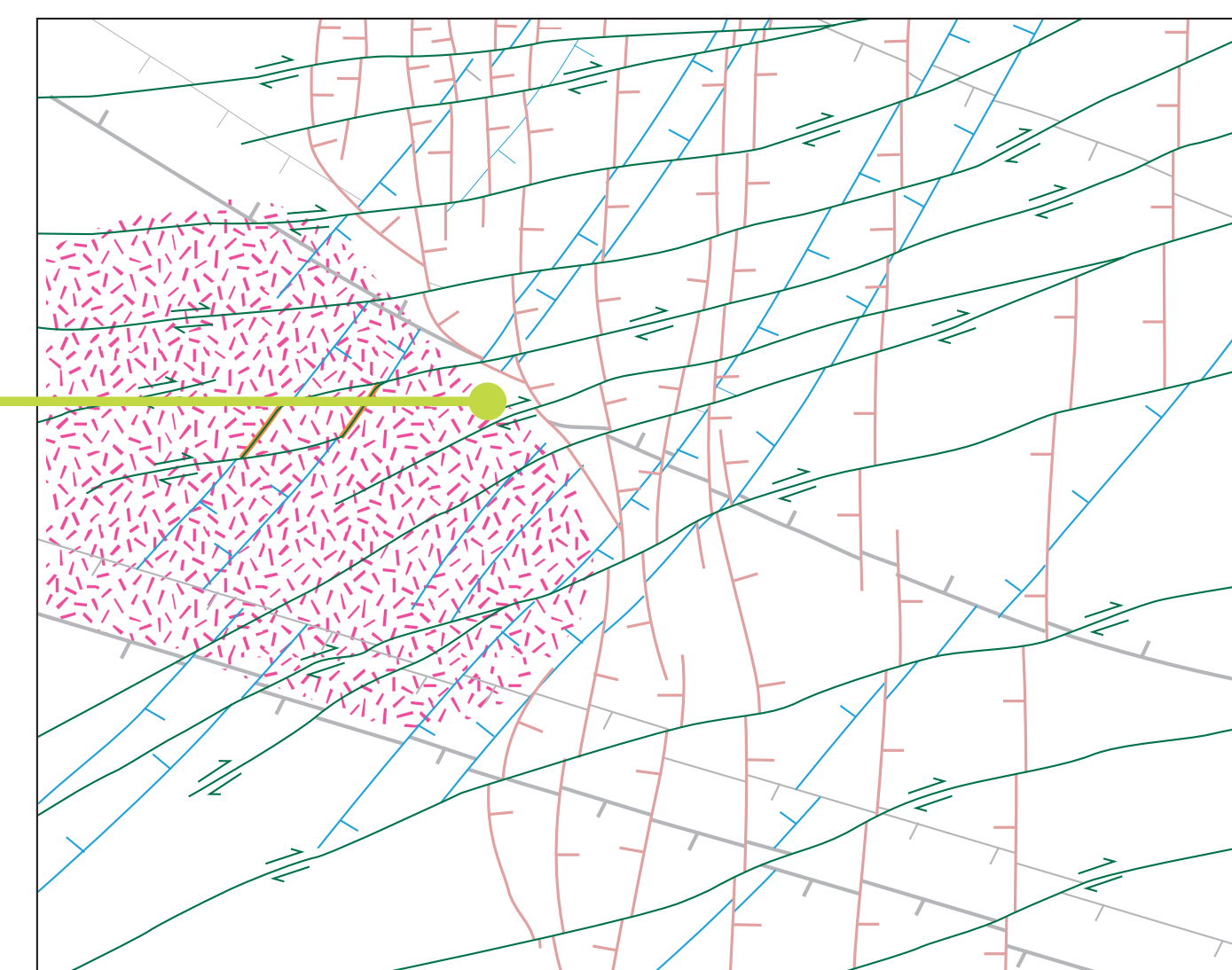
- Trap formation: tilted fault blocks
- Affects deposition
- Causes burial of source rocks
- Salt diapirs and pillows are typically located above these faults. Shallow gas fields are commonly located above these salt features

- See poster on Lower Carboniferous and the poster on hydrocarbon charge for examples

Jurassic – Palaeogene

Newly discovered fault trend.

- Predominantly dextral strike-slip faulting along N060-N080 trending faults
- Conjugate fault set occurs locally
- Timing: Jurassic-Cretaceous. Minor activity during the Late Cretaceous, and possibly the Palaeogene
- Clearly expressed only below Zechstein salt, or where salt is absent
- Often overlooked when vertical offset is small



Relevance of this fault trend:

- Trap formation: pop-ups
- Causes vertical offset of Base Silverpit/Base Zechstein locally, creating additional closures
- May cause compartmentalization by sealing faults that have limited vertical offset but significant horizontal offset

