

Geological Evolution for Reference Expert 1



1.

Layers of sediment deposited up to top of package 1.

(Inferred)



2a.

Salt layer deposited on top of package 1.

“There looks to be a significant salt layer (pink) across the seismic image”.

Right fault active.

(Inferred)



2b.

Layers of sediment deposited up to top of package 2.

(Inferred)



3.

Layers of sediment deposited up to top of package 3.

(Inferred)



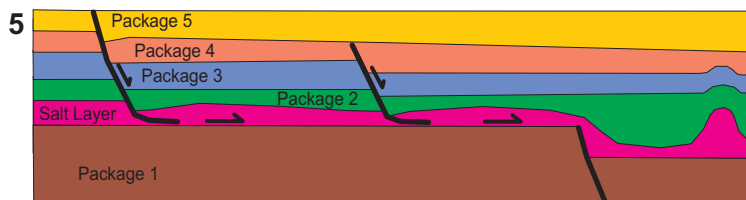
5.

Layers of sediment deposited up to top of package 5.

(Inferred)

Regional tilting event occurred. Left and middle faults activated and packages 2 to 4 detached on package 1 to the right. Growth faulting on left fault. Fold on right side was generated by downdip compression.

“There is also a fold structure on the right-hand side. This is the classic recipe for detachment tectonics: updip extensional domains and downdip compressional domains, which we have here. A late regional tilting action probably activated the listric faults and caused the gravity sliding – timing shown by stratigraphy (yellow). Tilting occurs at time of growth on listric faults”.

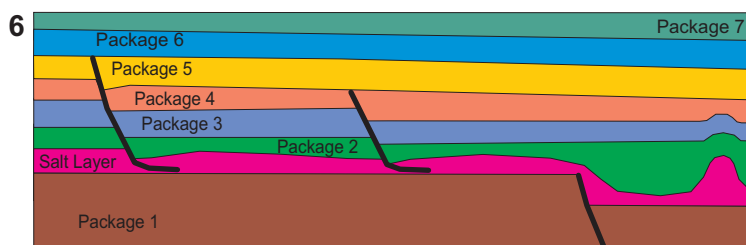


6.

Layers of sediment deposited up to top of package 7.

Packages 6 and 7 thicken to the right side due to tilting at previous step.

(Inferred)



Note

Timing of fault on right side is unclear.

Geological Evolution for Reference Expert 2



1.

Layers of sediment deposited up to top of package 1.

(Inferred)

Minor faults active on right of package 1.

Right side of horizon 1: "Push up structure [is] possibly inverted presalt faults".



2a.

Salt deposited on top of package 1.

Horizon 1: "Base Salt".



2b.

Layers of sediment deposited up to top of package 2.

(Inferred)



3.

Layers of sediment deposited up to top of package 3.

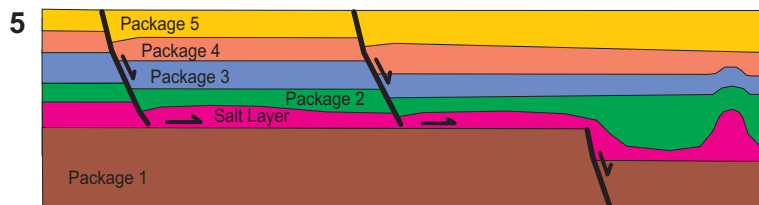
(Inferred)



4.

Layers of sediment deposited up to top of package 4.

(Inferred)



5.

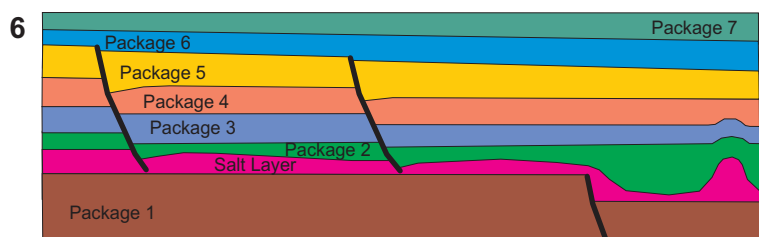
Layers of sediment deposited up to top of package 5.

(Inferred)

Regional sag tilting event occurred forming a 'steer's head' structure. The sag tilting event activated the left and middle faults, which detached on package 1 to right with folding of packages 3 and 4. Package 5 thickened to right.

"Regional thickening into the basin (sag-style) evident above this grey package [packages 5 to 7] so basinwards tilting probably triggered salt tectonics (latest phase, updip extension)".

Observation: Growth strata have been annotated on horizon 4 of the left fault.



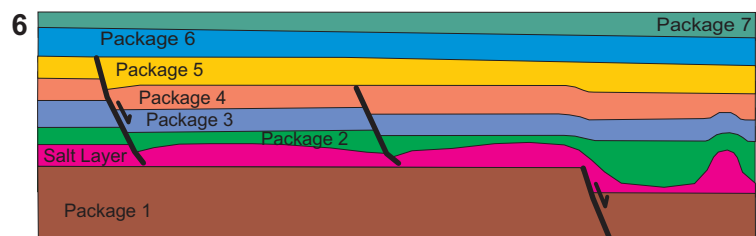
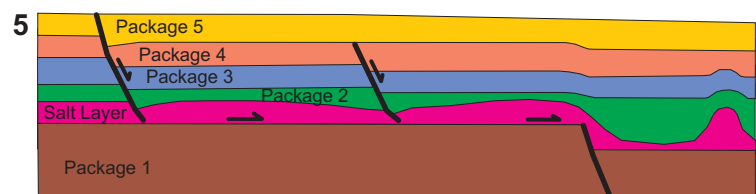
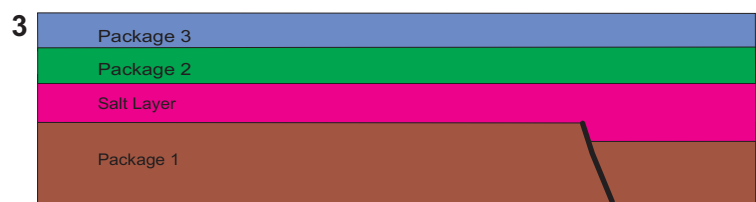
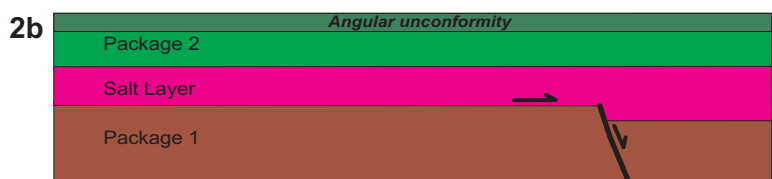
6.

Layers of sediment deposited up to top of package 7.

Packages 6 and 7 thicken to right due to tilting at previous step.

"Regional thickening into the basin (sag-style) evident above this grey package [packages 5 to 7]".

Geological Evolution for Reference Expert 3



1.

Layers of sediment deposited up to top of package 1.

(Inferred)

2a.

Salt deposited on top of package 1.

"Lower amplitude zones at this level [package 2] are interpreted to be salt or some other relatively mobile material".

2b.

Layers of sediment deposited up to top of package 2.

(Inferred)

Normal faulting; beds in package 2 were deformed (rotated).

"The first [phase of movement] is indicated by normal faults and steep bed dips between Horizons B and C [package 2]".

Horizon 2 formed an angular unconformity with the beds below.

"This deformed B-C interval [package 2] is overlain by A-C [packages 3 and 4], deposited in a tectonically quiescent period with C [horizon 2] forming a locally angular unconformity truncating underlying dipping reflectors".

3.

Layers of sediment deposited up to top of package 3 in a tectonically quiescent period.

"This deformed B-C interval [package 2] is overlain by A-C [packages 3 and 4], deposited in a tectonically quiescent period with C [horizon 2] forming a locally angular unconformity truncating underlying dipping reflectors".

4.

Layers of sediment deposited up to top of package 4 in a tectonically quiescent period.

(See quote in step 3).

5.

Package 5 deposited while left fault was active; growth faulting on left fault and on right monocline.

"Growth strata associated with both normal faulting and folding occur in this interval [package 5]".

Observation: Growth strata have been annotated on horizon 4 of the left fault and on the right monocline on horizon 4.

Packages 2 to 4 detached on salt along horizon 1 to the right, with coeval folding on right side.

"A second phase of deformation initiated at A [horizon 4] with extensional faulting on the left of the section and synchronous folding on the right indicating gravitational sliding towards the right on the décollement B [horizon 1]".

Main deformation occurred in package 5.

"This deformation occurred mainly in the interval between deposition of A and D [package 5]".

Trigger: "This second phase of deformation may have been triggered by movement on a normal fault at depth which offsets B [right fault] and thickness variations in A-D [Package 5] directly above this fault suggest that it was active at this time".

6.

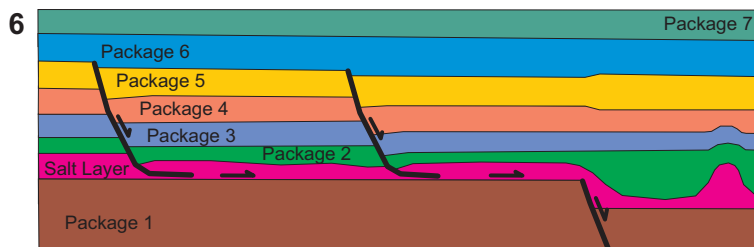
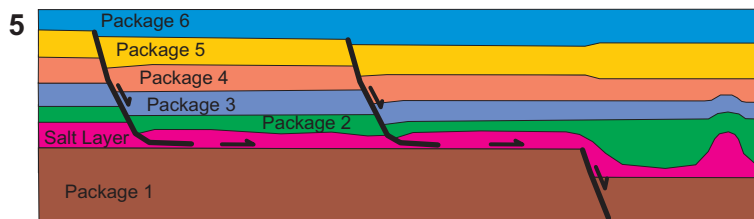
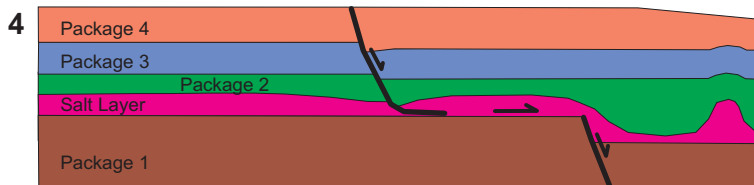
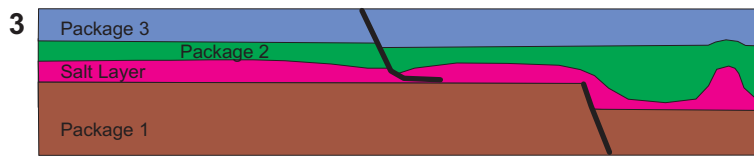
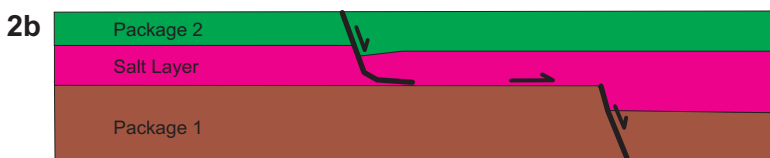
Layers of sediment deposited up to top of package 7.

(Inferred)

Minor movement on left fault and right fault during deposition of package 6.

"Local truncations (labelled 'X') above horizon D [horizon 5] indicate that this fault [right fault] may have had some activity later than D [horizon 5] as has the normal fault on the left of the section [left fault]".

Geological Evolution for Reference Expert 4



1.

Layers of sediment deposited up to top of package 1.

(Inferred)

2a.

Salt deposited on top of package 1.

Package 2: "Probable top salt".

Package 1 extended to right, mainly on right fault.

Observation: Salt drape over right fault and "depocentres" noted.

"Thick skinned extension (fault C and others) [right fault]

during, at least, teal-to-red time [top of package 2]. Probably also during evap time, triggering salt movement".

2b.

Layers of sediment deposited up to top of package 2. Salt movement as sediment was deposited.

"Salt movement was already active during ongoing evaporite deposition, as known from various salt basins".

Package 1 extended to right, mainly on right fault.

Package 2 mainly extended to right on middle fault, detached on salt layer on the top of package 1.

"Thick skinned extension (fault C and others) [right fault] during, at least, teal-to-red time [top of package 2]. Probably also during evap time, triggering salt movement. Extension decoupled with presalt primarily extending at fault C [right fault] and suprasalt extending mostly on fault B [middle fault]".

Postrift gravity gliding on package 2 due to differential thermal and loading subsidence.

Package 2: "Postrift gravity gliding (detached on salt) due to differential thermal and loading subsidence (larger faults to right?)"

3 + 4.

Layers of sediment deposited up to top of package 3. Layers of sediment deposited up to top of package 4. Middle fault active with extension to right on packages 3 and 4, detached along top of package 1. Coeval shortening on right side; thinning and erosional truncation over fold on right.

"Extension between red and green time [packages 3 and 4] on fault B [middle fault], coeval shortening, thinning and erosional truncation".

Observation: toplap arrows drawn underneath right side of horizon 4.

5.

Layers of sediment deposited up to top of package 6. Ongoing extension during deposition of package 5, but main activity shifted from middle fault to left fault. Right side of package 5 thickened due to ramping over right fault. Package 6 thickened to right side. Further folding on right side.

"Ongoing thin-skinned extension between green and yellow [horizons 4 to 6], but shifted to fault A [left fault]. Ramping over fault C [right fault] thickens overlying section, coeval shortening probably off-section to right". (Trigger for fault activity not mentioned).

6.

Layers of sediment deposited up to top of package 7. Package 7 thickened to right side. Minor subsidence with continued infill.

"Minor differential subsidence post yellow [packages 6 and 7]".

Geological Evolution for Reference Expert 5



1.

Layers of sediment deposited up to top of package 1.

Observation: Package 1 labelled as "Basement".

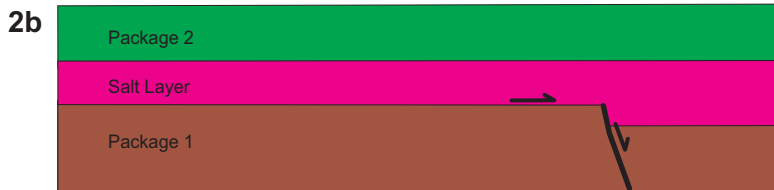


2a + 2b.

Salt deposited on top of package 1.

Salt layer: "Internally lots of unconformities and discontinuities which look salt-related (rim synclines)".

Observation: Salt layer has "Salt?" annotated on it.



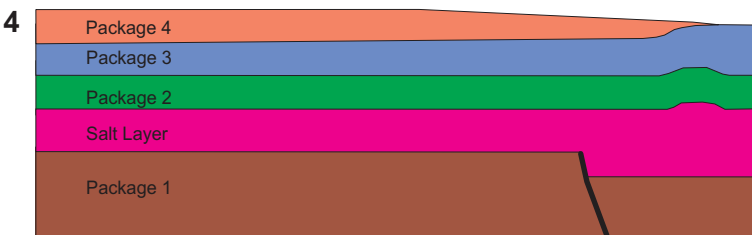
Layers of sediment deposited up to top of package 2. Salt movement as sediment was deposited.



3.

Layers of sediment deposited up to top of package 3.

Package 3: "Deposition across area".



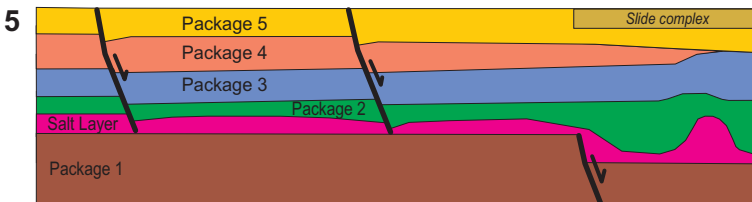
4.

Layers of sediment deposited up to top of package 4.

(Inferred)

An erosion surface formed at right side of horizon 4.

Observation: Right of horizon 4 has "erosion surface" annotated.



5.

Layers of sediment deposited up to top of package 5.

(Inferred)

Left and middle faults were active during deposition of package 5 (growth faulting).

Packages 4 and 5: "Extension and instability".

Observation: Package 5 has "growth faulting" annotated on the left fault.

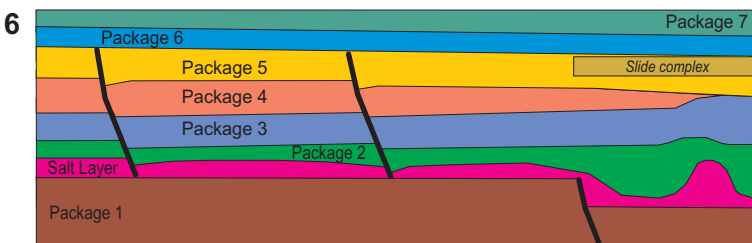
Facies change in package 5 on right side.

Package 5: "Facies change".

A slide complex formed at top of package 5 on the right side.

Observation: "slide complex" was annotated at the top of package 5 on the right side.

(Trigger for fault activity not mentioned).



6.

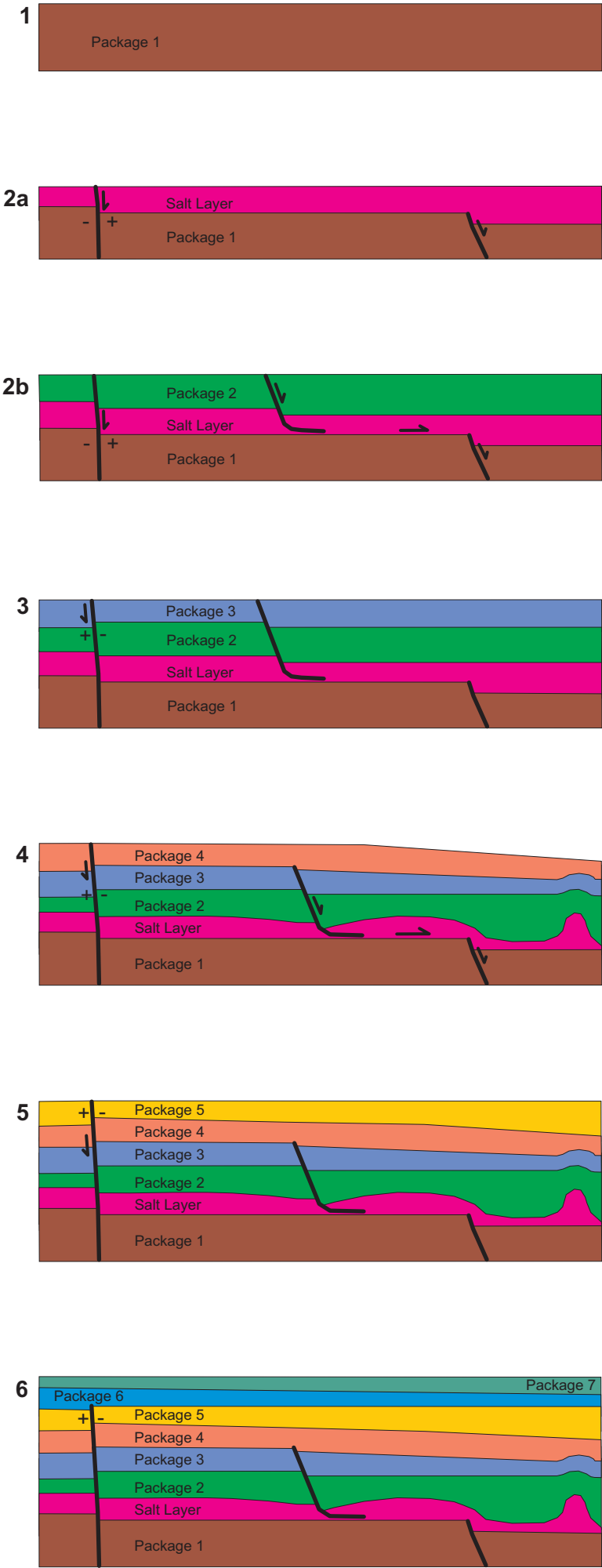
Layers of sediment deposited up to top of package 7.

(Inferred)

Packages 6 and 7 thicken to right side with onlaps.

Packages 6 and 7: "Package of onlapping wedges to left, subtle truncation of packages".

Geological Evolution for Reference Expert 6



1.
Layers of sediment deposited up to top of package 1.
(Inferred)
- 2a.
Salt deposited on top of package 1.
Package 2: "Salt or shale in this section".
Left fault was active (strike-slip) causing offset on horizon 1.
Observation: The left side of horizon 1 went up relative to the right side.
- 2b.
Layers of sediment deposited up to top of package 2.
Salt movement as sediment was deposited.
Observation: offset in horizon 1 due to strike-slip movement on left fault.
Middle fault and small faults in middle were active, detaching to right side on top of package 1.
Observation: "Detachment" annotated on horizon 1; fault geometries drawn in.
3.
Layers of sediment deposited up to top of package 3.
Strike-slip movement on left fault changed direction (polarity change).
Observation: The right side of horizon 3 went up relative to the left side.
(Inferred)
4.
Layers of sediment deposited up to top of package 4.
(Inferred)
Continued strike-slip movement of left fault with same polarity.
Observation: Horizon 4 has the same relative side offset as horizon 3 (the right side goes up relative to the left side).
Package 4 thinned to right side.
Observation: "Thin", with arrow to right side annotated on horizon 4.
Fold on right side was generated by compression.
Observation: Fault geometries drawn in.
5.
Layers of sediment deposited up to top of package 5.
(Inferred)
Continued strike-slip movement of left fault with same polarity.
Observation: Horizon 5 has the same relative side offset as horizon 4 (the right side goes up relative to the left side).
Package 5 was thinning to left side of section on an erosion surface.
Observation: "Thin" with arrow to left side annotated in package 5.
Observation: "Alternating wedges" annotated with cartoon showing alternating wedges.
6.
Layers of sediment deposited up to top of package 7.
(Inferred)