

## Storfjorden Earthquake Sequence: 2008-2016

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An earthquake sequence in the Storfjorden offshore area southwest of Spitsbergen in the Svalbard archipelago initiated with a magnitude  $M_w = 6.1$  on 21 February 2008 event. This area had previously not produced any significant earthquakes, but between 2008 and 2016 more than 2,000 earthquakes were detected with more than 20 of them being of moderate size ( $M > 4.0$ ). These earthquakes occur at mid crustal depths (10-18 km). Applying double-difference relocation to improve relative locations reveals that the activity is linked to at least three subparallel faults striking SW-NE. Some of the earthquakes appear to be more diffuse and could not be associated to faults with certain orientations. The SW-NE trend is also found as possible fault planes from regional moment tensor inversion. The solutions range from pure normal to pure strike slip solutions, but are consistent with the compressional  $\sigma_1$  axis roughly in E-W direction and plunging  $52^\circ$ , and extensional  $\sigma_3$  axis sub-horizontal trending N-S. The oblique, right-lateral strike-slip on SW-NE trending faults with normal component and pure normal faulting events between the subparallel strike-slip faults suggests a nascent pull-apart basin structure in the center of the seismic zone. Most recently, a magnitude  $M_w = 5.2$  occurred on 29 March 2016. This event lies to the northeast of the previous activity towards Edgeøya, was followed by aftershocks and had a strike-slip mechanism with a SW-NE striking nodal plane. This indicates that the active area is larger than previously estimated based on the earthquake distribution.