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Oil and gas exploration in frontier areas – an arctic update from Greenland

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Greenland is by far the largest island in the world with the landmass extending from 59°44'N towards the north pole terminating at 83°40'N. The offshore areas of Greenland are equally large and the oil and gas potential is believed to be of major importance for the worlds undiscovered oil and gas resources.

In 2007 [1] the United States Geological Survey (USGS) estimated the undiscovered resources for the East Greenland Rift Basins Province to contain approximately (mean) 31,400 Million Barrels of Oil Equivalent (MMBOE) of oil, natural gas, and natural gas liquid. In 2008 [2] USGS estimated the undiscovered resources for the West Greenland and East Canada Provinces to contain approximately (mean) 17,500 MMBOE of oil, natural gas, and natural gas liquid. Both estimates are based on offshore provinces north of the Arctic Circle only, hence excluding hydrocarbon potential south of the Arctic Circle (e.g. southern Davis Strait).

Oil and gas exploration in Greenland began in 1969 and since then more than 200,000km of 2D seismic have been acquired offshore south, west and east Greenland. More recently 3D surveys have been acquired offshore south and west Greenland. A total of 14 exploration wells have been carried out in western Greenland waters, with the most recent being five wells drilled in the 2011 season by Capricorn Greenland Exploration Limited.

At present 18 exploration licenses for hydrocarbons are active in Greenland, with 16 of these being offshore. From 2013 to 2014 five new exploration licenses have been awarded in the Northeastern offshore area of Greenland. The ice conditions in these areas are challenging, however TGS-NOPEC Geophysical Company managed to acquired 7,584km 2D data during the 2015 season in this area.

In the Greenland Oil and Mineral Strategy for 2014 to 2018 three licensing rounds are to be carried out from 2016 to 2018. Additionally two Open Door Areas were defined in 2014 resulting in two new licenses onshore Jameson Land (East Greenland) in 2015 (for more information see the Ministry of Mineral Resources homepage www.govmin.gl).

From the Carboniferous to the end of the Cretaceous eastern Greenland and western Norway shared the same sedimentary basin systems. During the Cenozoic Greenland and Norway separated due to spreading along the Mid-Atlantic Ridge. Correlation of these basins are important in relation to Greenlandic hydrocarbon exploration, as many of the Norwegian oil and gas fields situated in the North Sea and Norwegian Sea today are producing from correlative formations to the East Greenland continental shelf.

Exploration in the Arctic is generally at high risk, but the chance of making a major hydrocarbon discovery is more prone to happen here, rather than in well-explored areas – which is more likely to contain prospects of much smaller volumes. The presence of the oil and gas operators in Greenland

today indicates, despite the current situation on the oil and gas market, that companies are willing to take the risk in order to explore major hydrocarbon resources in the future.

References:

[1] Gautier D L (2007) U.S. Geological Survey Fact Sheet FS-2007-3077, 4 p

[2] Schenk, C J et al. (2008) U.S. Geological Survey Fact Sheet FS-2008-3014, 2 p.

