#6—Gerland (Regional Outlook)

Notes for the Arctic Sea Ice Outlook for the areas Greenland Sea and Barents Sea (Status: 1st July 2008)

The Greenland Sea and the Barents Sea are Arctic regions with different basic sea ice regimes. The Fram Strait in the northern Greenland Sea represents the only deepwater connection between the Arctic Basin and the other world oceans. The dominant part of sea ice exiting the Arctic Basin drifts through the Fram Strait, at the end of the transpolar drift. Consequently, ice in the very dynamic Fram Strait and Greenland Sea consist to a large part of advected sea ice that was formed further north in the Arctic Basin, or in the Siberian shelf seas. Ice types in the Fram Strait include multi-year ice, and first-year ice (season depending). Contrary, the more shallow Barents Sea consists mainly of seasonal ice (first-year ice), that was formed in the Barents Sea and Kara Sea.

The difference in the ice regimes in these two regions make the Barents Sea more likely to respond faster and more directly to changes in atmospheric and oceanic conditions, and climate.

Regarding the development in 2008, we review the mean ice extent for June 2008 relative to means of time spans on decadal scale back to 1979 (Fig. 1). However, these ice edges are limited in what they can show, since i. the spatial resolution of passive microwave sensors is limited to about 10-20 km (depending of year of observation and post-processing), ii. because monthly means average over different conditions within one month. Ice conditions in early June can differ from those in late June substantially, and iii. means over 10-20 and 30 years remove interannual variability of ice extents. Saying this, we find this choice is still well illustrating changes over the last decades. In large parts of the Barents Sea one can see that the position of the marginal ice zone in June was on average further north since 1999 compared to the 20 years before that. 2008 fits in the same range. In the Fram Strait, no big changes in ice extent can be seen (on this scale), both the decadal means and the 2008 observations are in the same area. The data show also the appearance of polynyas east of northern Greenland and south of Franz Josef Land (NE Barents Sea). These areas are known for their polynyas. For the area south of Franz Josef Land, it is interesting that the polynya appears also in the 1999-2008 mean.

In September 2007 (Fig. 2), the sea ice extent means indicate changes during the last 10 years for the Barents Sea, where the MIZ was significantly further north. Also in the Greenland Sea the last decade shows less ice, but 2007 appears rather similar to extents from earlier than the last decade.

The passive microwave satellite observations do not give information on ice thickness, and here we have only considered ice concentration more than 30% and not taken account of variability of higher ice concentrations. Combining the limitations of this data with the (interannual) variability in atmospheric and oceanic conditions between now and September 2008 leaves a wide range of scenarios open for how sea ice conditions may develop throughout the summer.

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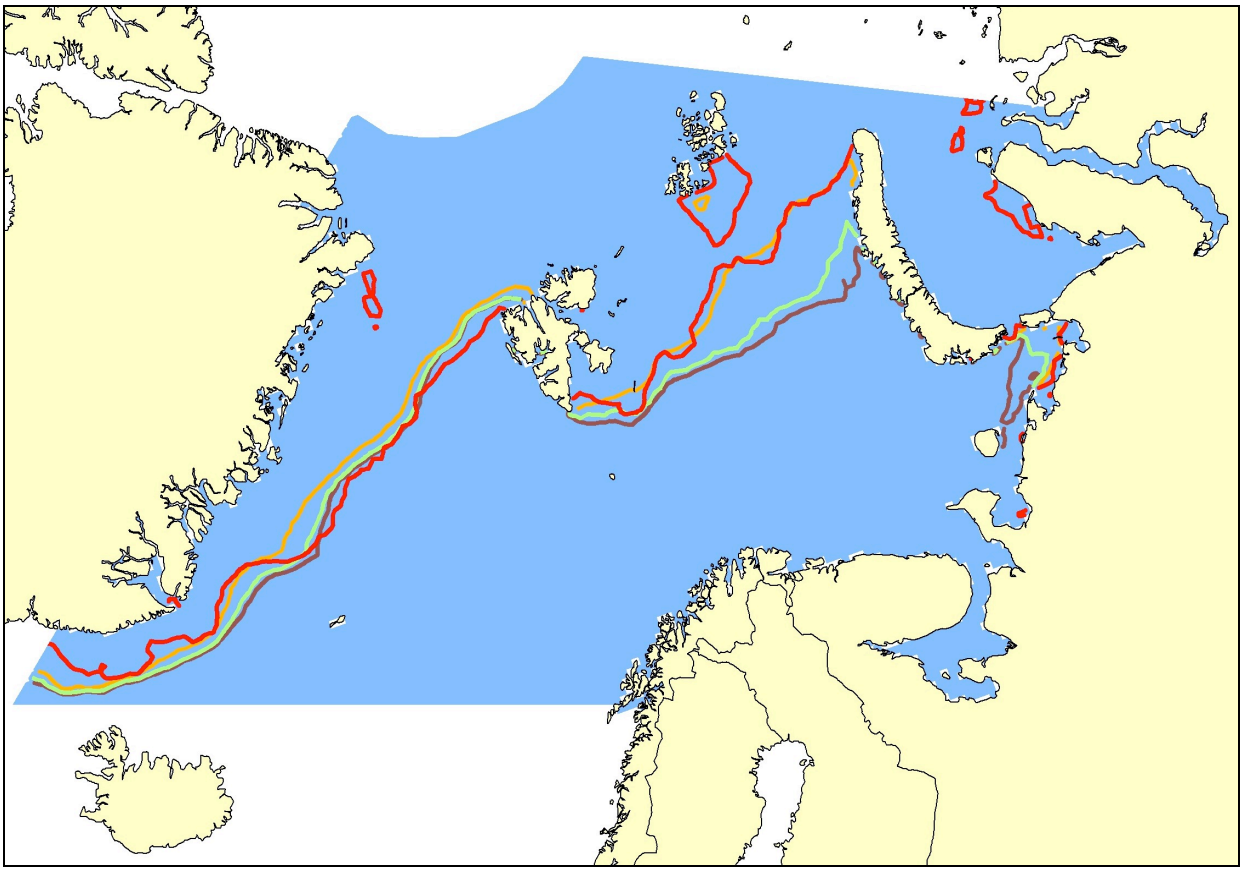

Figure 1: Ice extent (monthly means, June) southern border of 30% ice concentration) in the Greenland Sea/Fram Strait and Barents Sea, based on passive microwave satellite data (red = June 2008, orange = mean June 1999-2008, green = mean June 1979-2008, purple = mean June 1980-1999).

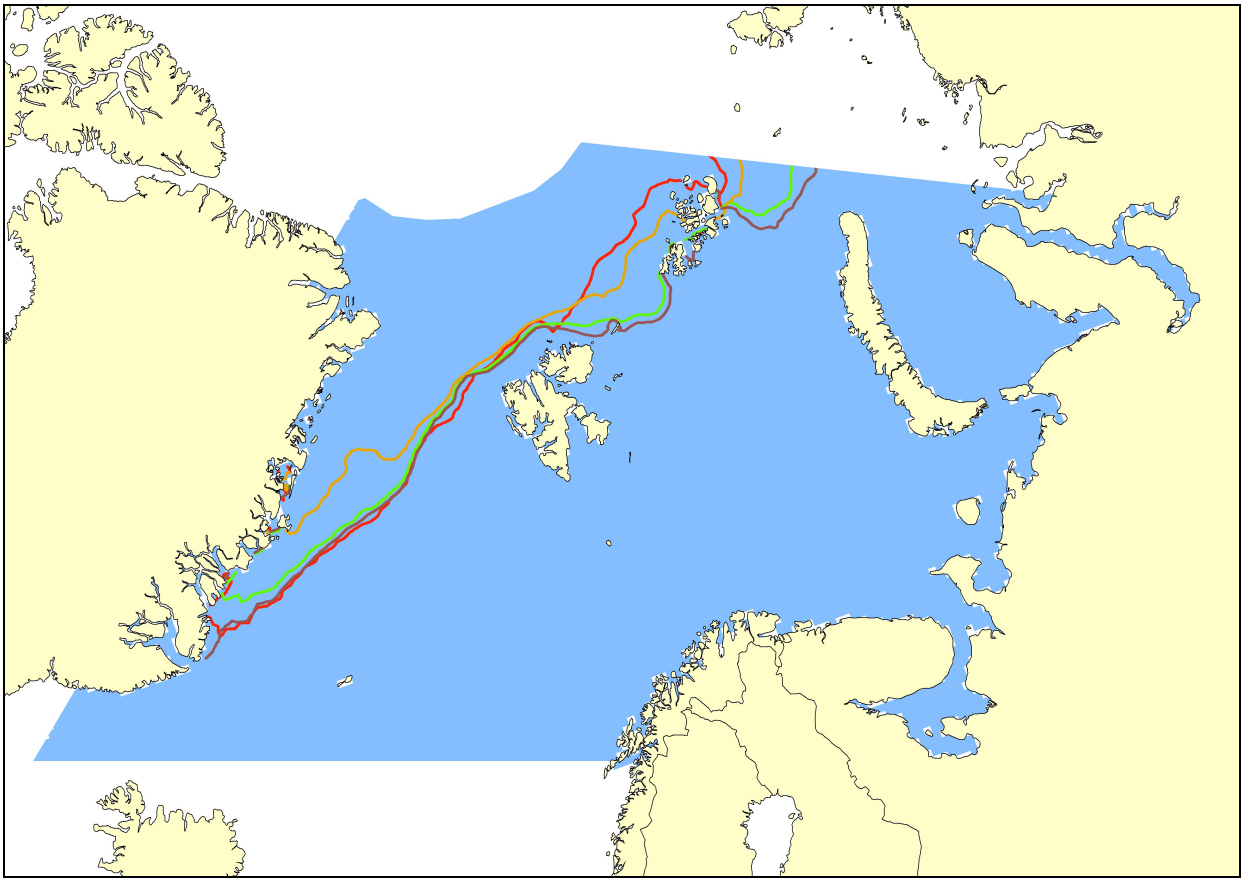

Figure 2: Ice extent (monthly means, September) southern border of 30% ice concentration) in the Greenland Sea/Fram Strait and Barents Sea, based on passive microwave satellite data (red = Sept. 2007, orange = mean Sept. 1999-2007, green = mean Sept. 1979-2007, purple = mean Sept. 1980-1999).