4.3. Zooplankton

4.3.1 Spatial distribution and biomasses

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The total number of stations in 2015 increased compared to the previous year from 232 to 263. The Norwegian survey part was monitored by MOCNESS and WP-2 nets, the Russian part by Juday net. Previous investigations show that the total zooplankton biomass by the three gears is comparable.

Biomass distribution based on BESS 2015 data is shown in Figure 4.3.2.1. The average biomass value for 2015 (7.3 g m^{-2} dry weight) is not directly comparable with 2014 (6.7 g m^{-2}) as the area cover differed in the two years, especially between Svalbard/Spitsbergen and Franz Josef Land. It was not monitored in 2014 due to extensive ice cover. The general biomass distribution pattern however, is somewhat similar in both years with high biomasses in the west and low biomasses in the central of Barents Sea.

The region with high biomass (>8 g m^{-2}) area in the west is much larger in 2015 compared to 2014, spreading northwards to west of Svalbard/Spitsbergen. In contrast, biomass in the eastern region was reduced in 2015 (3-10 g m^{-2} in 2015) instead 2014 (> 10 g m^{-2}). Furthermore the area south of the Svalbard/Spitsbergen showed a significant increase in biomass, from 1-5 g m^{-2} in 2014 to 5-10 g m^{-2} in 2015 spreading northwards to west of archipelago.

The area with low biomass in the central and southern parts was reduced in 2015 compared to the two previous years. This could be due to several reasons, among other, due to less predation pressure from the capelin stock, which has unusually remained high (>3 million tons) for the last 6 years, but has drastically reduced in 2014-2015.

Results on *Calanus* abundance from the Fugløya-Bjørnøya section from the western entrance to the Barents Sea seem to indicate that *Calanus finmarchicus* abundance remained high in 2015 and 2014, likely contributing to the high biomass over larger areas observed in the west. (See the section 4.3.2. for more detail description.)

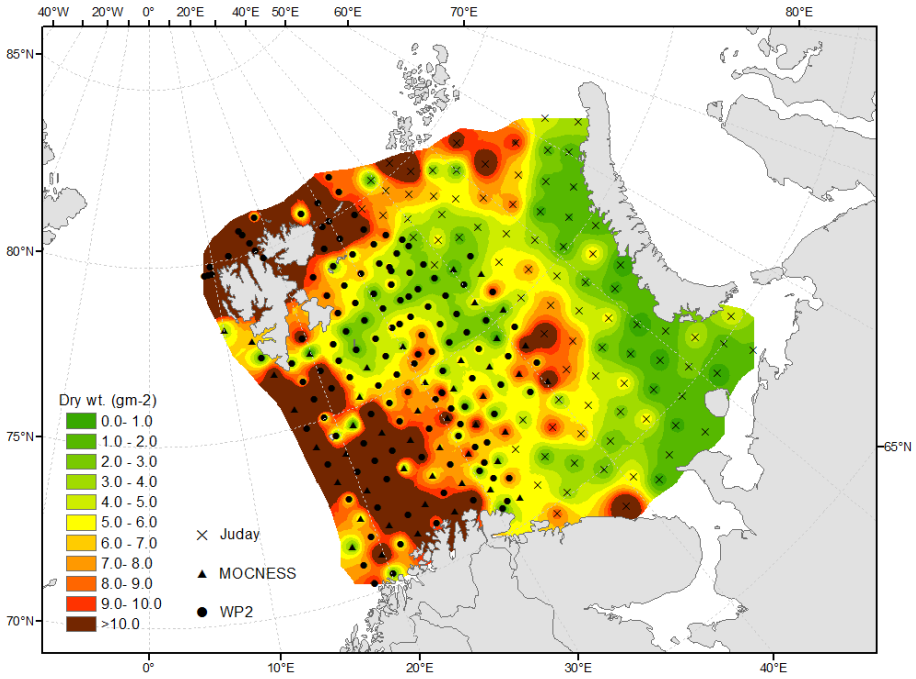

Figure 4.3.1.1. Distribution of zooplankton dry weight (g m^{-2}) in the 0m-bottom layer in BESS 2015.

4.3.2 Calanus composition at the Fugløya-Bear Island (FB) transect

Text and figures by P. Dalpadado and J. Rønning

The stations in the FB transect are taken at fixed positions located at the western entrance to the Barents Sea. The numbers of sampled stations are normally 5 to 8 depending on weather conditions. In this report, four stations, representing different water masses (coastal; Atlantic; and mixed Atlantic/Arctic water) from 1995 to 2015, have been analyzed for species composition of the three most abundant species *Calanus finmarchicus*, *C. glacialis* and C. *hyperboreus*. In addition, we have also examined the proportion of *C. finmarchicus* and *C. helgolandicus* (Stage V and adults) in the samples.

C. helgolandicus is quite similar in appearance especially to *C. finmarchicus*, but is a more southerly species with a different spawning period. *C. helgolandicus* has in recent years become more frequent in the North Sea and southern parts of the Norwegian Sea (Svinøy transect), and it is expected that it could potentially increase its abundance in the western part of the Barents Sea in the years to come. Results so far seem to indicate that the abundance of *C. helgolandicus* at the western entrance to the Barents Sea is rather low and has remained more or less unchanged during the study period (not shown).

Though *C. finmarchicus* display inter-annual variations in abundance, comparison of abundance during three periods shows somewhat stable values, with the latter period having a slight increase. (Figure 4.3.2.1, Table 4.3.2.1). The highest abundances of *C. finmarchicus* were recorded in 2010 over the whole transect except for the northernmost locality at 74º00'N, where the abundance was considerably lower (Figure 4.3.2.2). On average over all years since 2004, it is the locality at 73º30'N that shows the highest number of individuals. In

2015, very high abundances of *C. finmarchicus* (>100,000 no.m^{-2}) were observed at 73º30'N similar to in 2010. As expected *C. glacialis* has its highest abundance at the two northernmost stations, localities that are typical of a mixture of Atlantic and Arctic waters. The highest mean abundance (ca 15000 no.m^{-2}) was observed for the year 1997 (not shown). The most stable occurrence and the highest average abundance are found at the northernmost locality a 74º00'N having a mixture of Atlantic and Arctic water masses.

For *C. glacialis* there seem to be a decrease in abundance since 2007 with very low abundances in 2008, and 2012-2014, with an increase again in 2015 (Table 4.3.2.1). The lowest average abundance for *C. glacialis* recorded during 2013-2015 (388 no.m^{-2}) is somewhat comparable to 2007—2012 (407 no.m^{-2}), slightly lower compared to 2001-2006 (517 no.m^{-2}) and much lower in comparison with 1995-2000 (1877 no.m^{-2}). The lowest average abundance for *C. hyperboreus* recorded during 2013-2015 were higher than in 2007-2012 (49 no.m^{-2}), compared to 2001-2006 (179 no.m^{-2}) and 1995-2000 (108 no.m^{-2}).

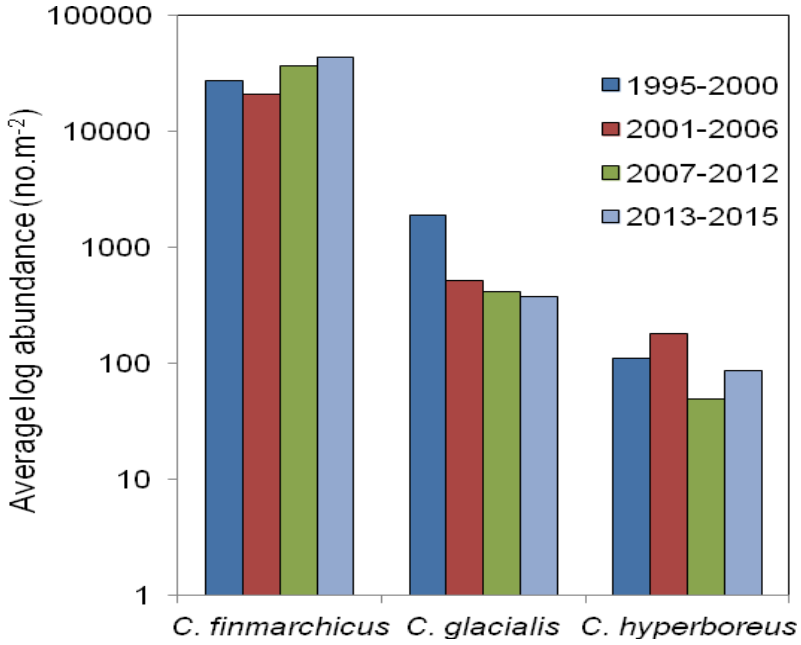

Figure 4.3.2.1. Abundance of *Calanus* species at the FB section during three periods: 1995-2000, 2001-2006, 2007-2012 and 2013-2015.

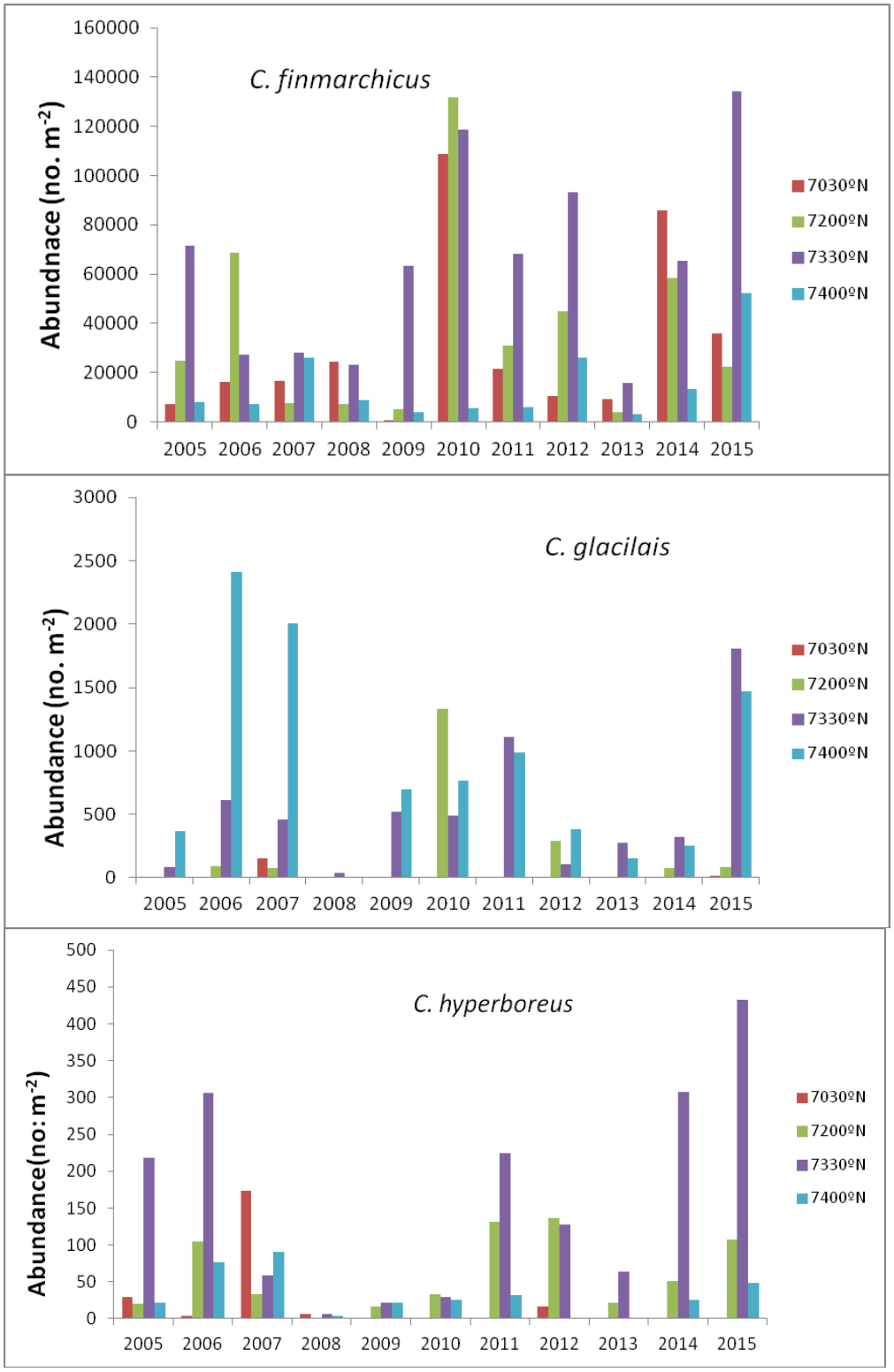

Figure 4.3.1.2. Development of copepod abundance along the FB section during the period 2005 - 2015. On a few occasions, when stations were lacking at a particular position, stations closest to that position were analyzed.