QCL WATER SCIENCE

AquaPhox Oxygen, pH and Temperature Meters

Blue Mussel Growth along a Fjord Coastal System

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Norwegian fjords exhibit a large spatial and temporal variability in environmental conditions. This is specially the case in the surface waters (~3m) where the salinity gradient along the fjord from the inner part to the open sea experiences extreme seasonal variability.

Blue mussels (*Mytilus edulis*) are a well-known inhabitant along this spatial range where it is restricted mainly to the surface layer. This study aimed to monitor the growth of mussels at different locations along a fjord (F*igure 1*) while recording the natural variability on food (chlorophyll), salinity, temperature and pH. This data is to be used to improve mechanistic models describing the performance of mussels along these gradients.

To do this, mussels were set up in these locations at 3m deep along with a CTD, a fluorometer, a turbidimeter and a PyroScience underwater pH logger (AquapHOx-L-pH).

Figure 1. Left to right: map showing locations in western Norway from coast to inland: Austevoll, Varaldsøy and Ulvik locations (red arrows); longline with mussels and instruments at Ulvik; and logger set-up with AquapHOx-L-pH logger

The experiment ran for 12 months. During this time, we recorded the environmental changes at three locations and the growth of the individual mussels. The 3 locations exhibited a contrasting environmental temporal variability (Figures 2, 3 and 4). Salinity being the most notorious variable.

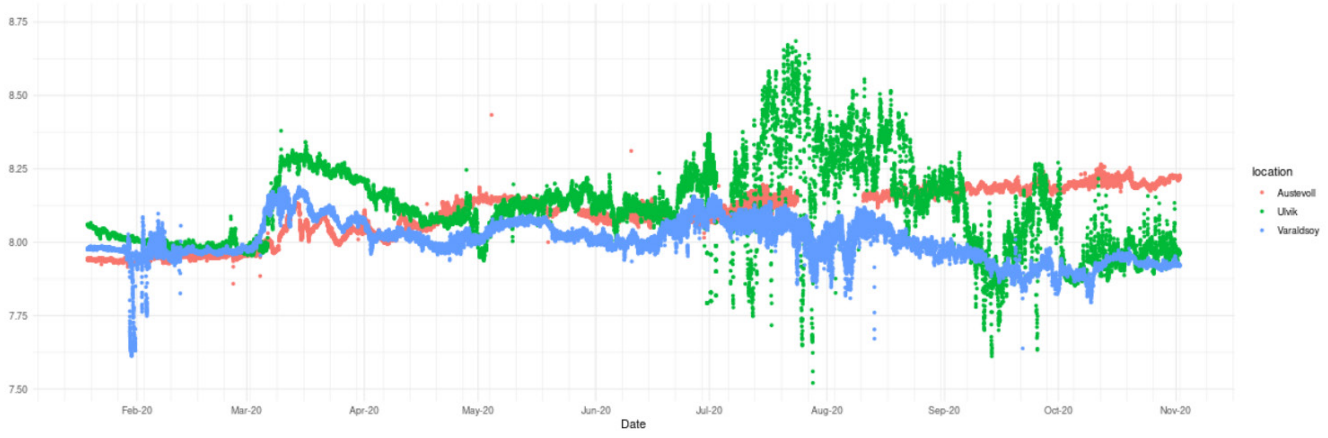

Figure 2. pH total data at 3m deep recorded between January and November 2020

Figure 3. Salinity data at 3m deep recorded between January and November 2020

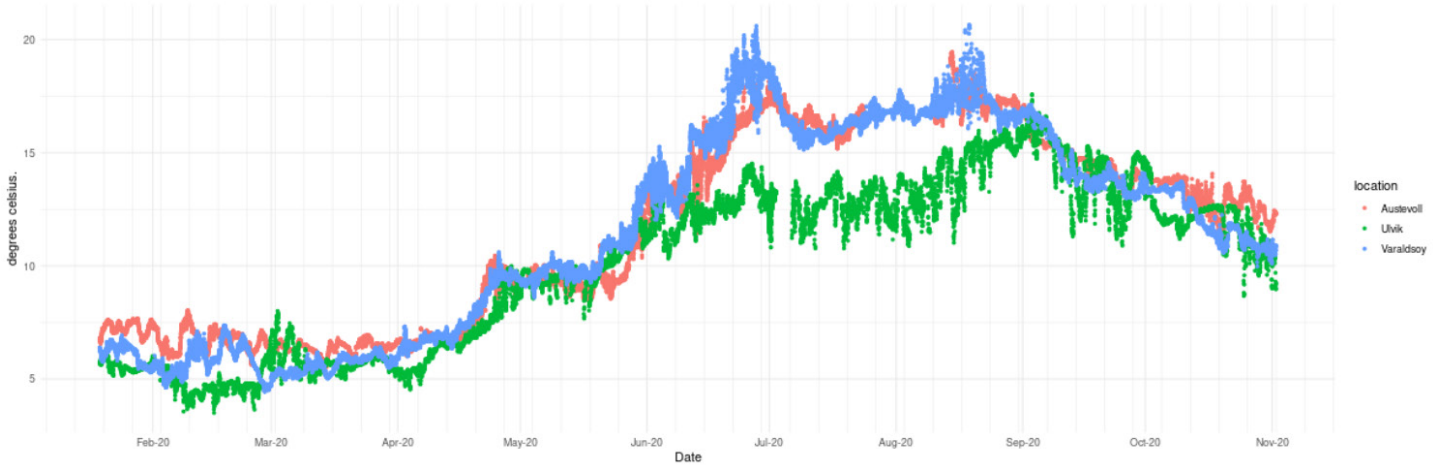

Figure 4. Temperature at 3m deep recorded between January and November 2020

Salinity seems to be the main driver of the performance of mussels and the main difference between locations. pH variability is low during winters but it is clearly influenced by primary production during spring and probably by salinity variability (run-off waters) later on during the year. More data is needed and this time series is being continued. More data on carbon chemistry together with pH is needed to further disentangle the correlations and further understand the effect of these variables on mussel performance.

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