Predicting the effect of decadal climate change on North Atlantic fisheries

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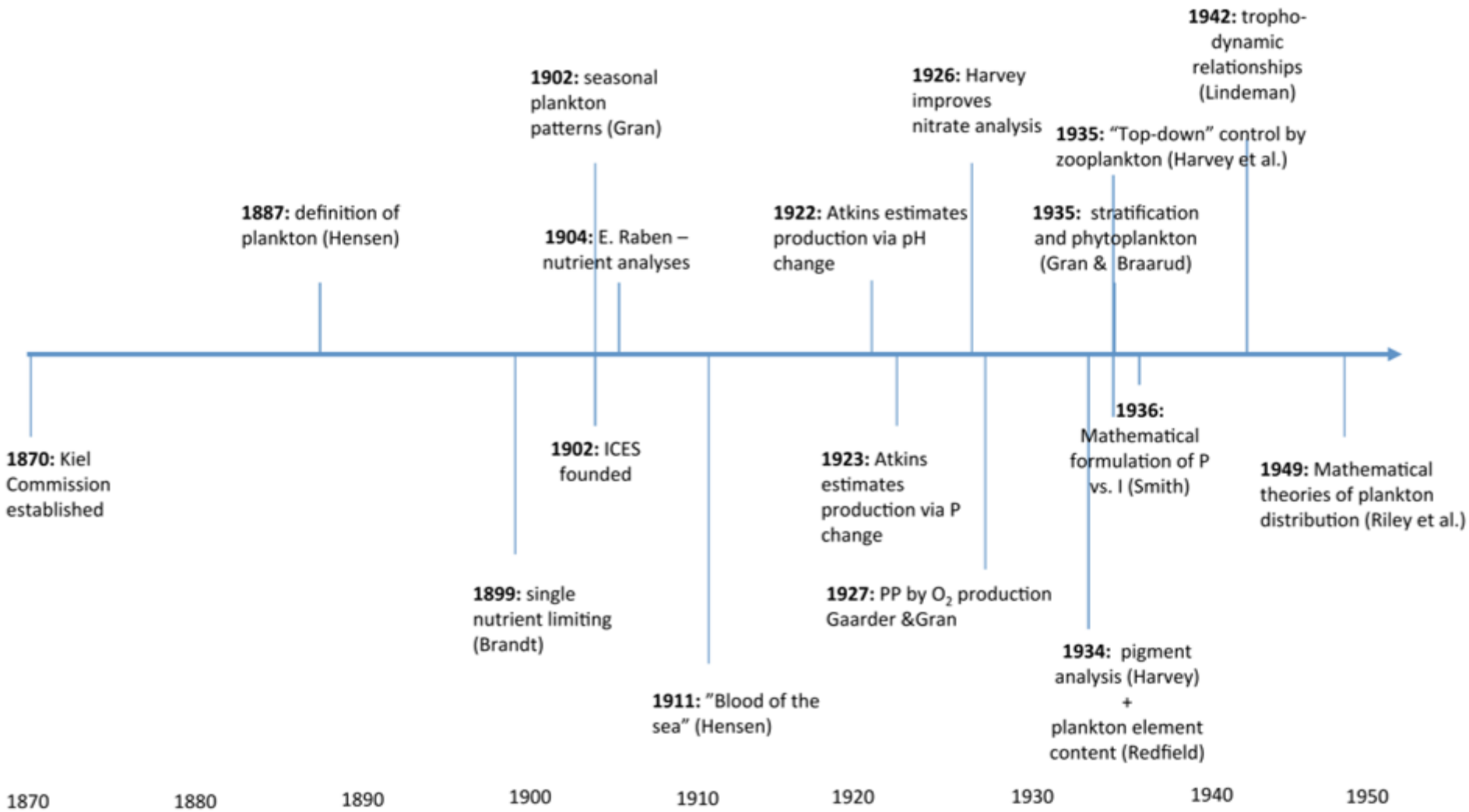
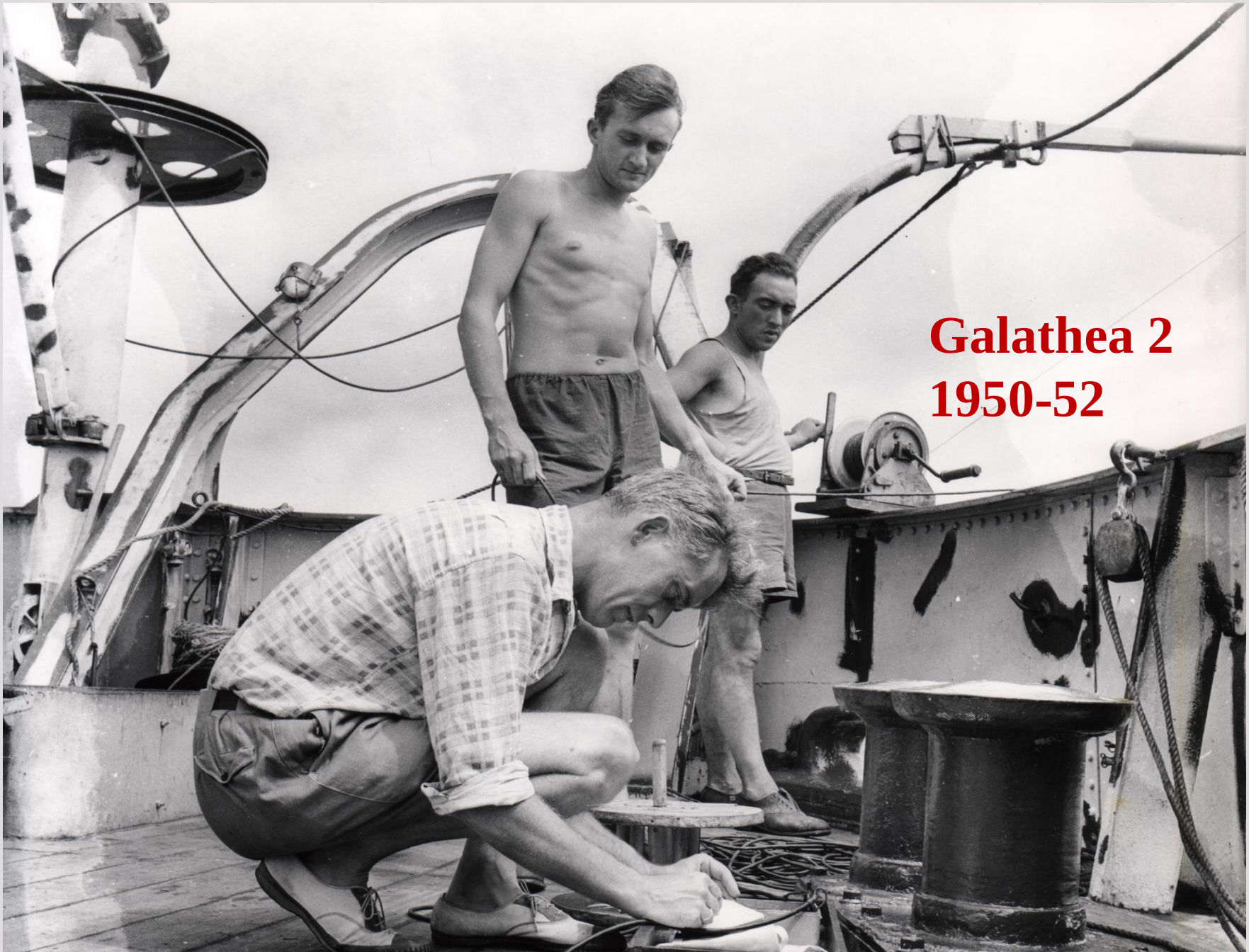
1. Lacking a mechanistic understanding of the relationship between oceanographic conditions and recruitment

Victor Hensen

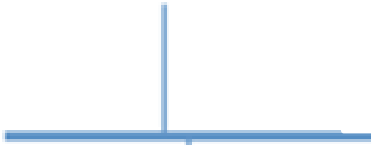
1835 - 1924

Phase 1: *Searching for the fisheries link*




Galathea 2
1950-52

1951: ^{14}C estimation of PP (Steemann Nielsen)



Finally! The method to link primary and fish production!!

Here, we stopped looking for a mechanistic understanding of recruitment!

2. Lacking a full understanding of how climate change will affect the North Atlantic

The NA is dynamic and characterized by large temperature differences

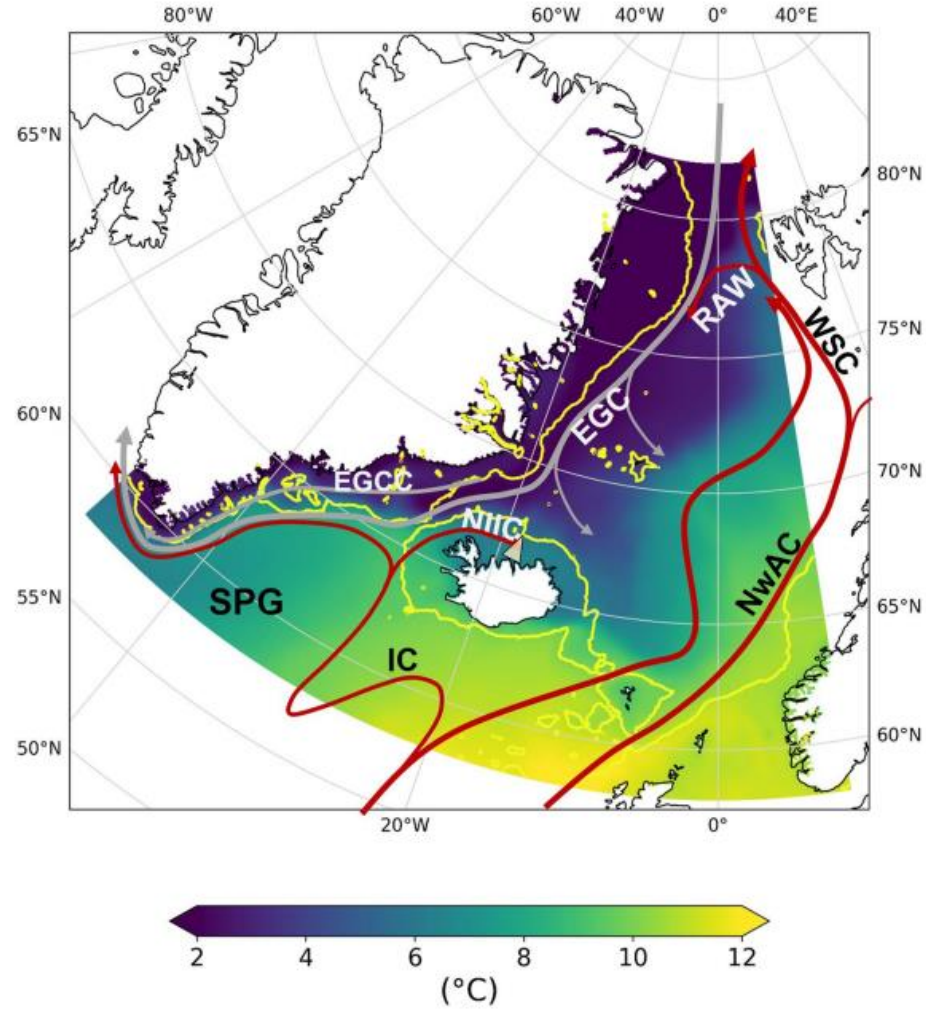


Figure 1. Average sea surface temperature calculated from 2007 to 2020 daily values derived from "Operational Sea Surface Temperature and Sea Ice Analysis (OSTIA)," developed by the Met Office (Table 1). Yellow contours indicate the 500 m isobath and red and gray arrows indicate major warm and cold surface circulation features in the region, respectively. The position of the Siglunes transect is denoted by the triangle on the north Iceland shelf.

What *can* we say about CC in the NA over the next 10 years?

- It will continue to warm – but not uniformly. Summer SST maxima (0.043^{o} C yr^{-1}).are increasing at twice the rate of winter maxima (0.023^{o} C yr^{-1})*

- SST change driven by at least 4 different processes: seasonality and warming trend, sub-polar gyre and NAO, local sea ice melt, and influx of warmer water from the Irminger Current.*

- The relative importance of these 4 processes to one another is not constant (or well understood).

*Saes et al., 2022 *Separating Annual, Interannual and Regional Change in Sea Surface Temperature in the Northeastern Atlantic and Nordic Sea*

We can expect conditions to be highly variable…

Now, more than ever, we are missing the mechanistic understanding of the relationship between recruitment and environmental conditions we gave up looking for in the 1950s!