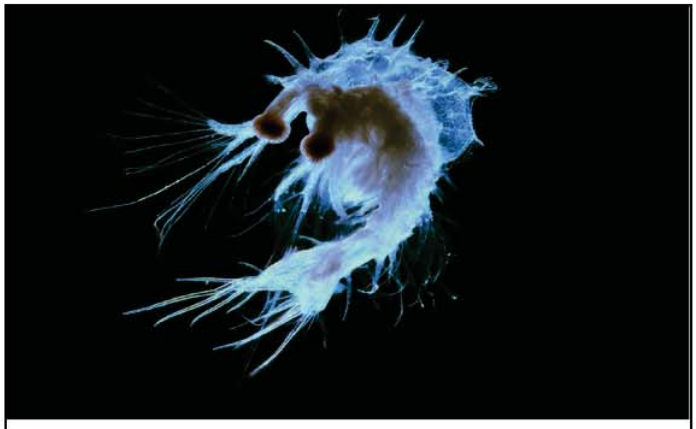

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Above :
Mud shrimp *Solenocera membranacea* larva, caught in the western Bay of Biscay. - Juan Bueno, Instituto Español de Oceanografía (IEO)

Cover image:
Assorted copepods and a decapod, caught in the Mallorca Channel. - María Luz Fernández de Puelles, Instituto Español de Oceanografía (IEO)

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4.1 Station 27 (Site 9)

Pierre Pepin

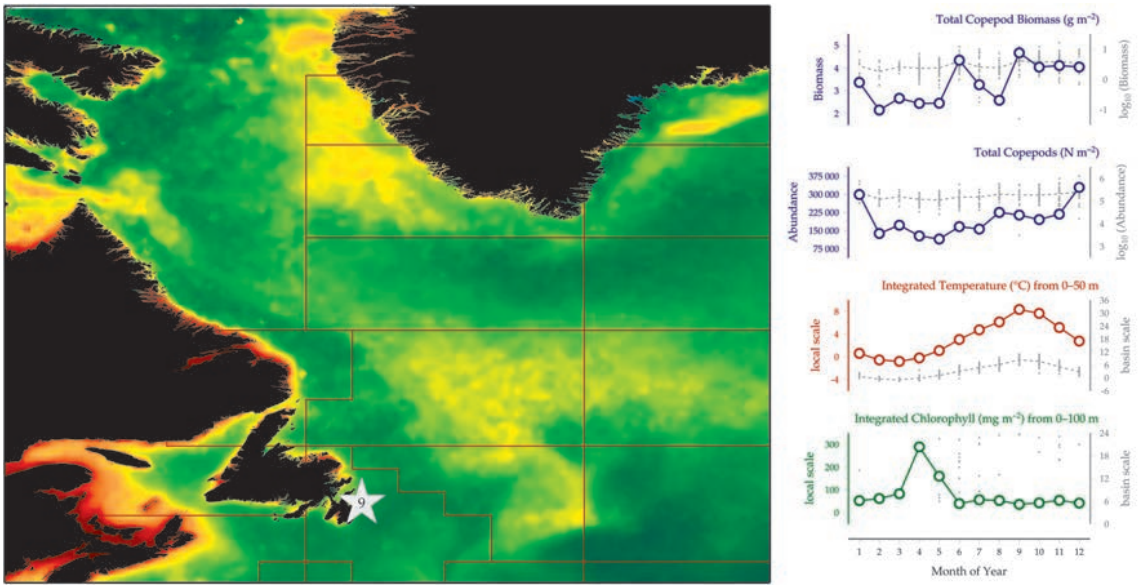


Figure 4.1.1
Location of the Station 27 monitoring area (Site 9) plotted on a map of average chlorophyll concentration, and its corresponding seasonal summary plot (see Section 2.2.1).

Zooplankton are sampled every 2–4 weeks (if possible) at Station 27, using a ringnet (0.75 m diameter, 200 µm mesh), towed vertically between near-bottom and the surface. Zooplankton are also collected seasonally at stations on a series of transects running perpendicular to the coast of Newfoundland across the Newfoundland and Labrador Shelves and the Grand Banks. Station 27 is located 5 nautical miles east of St John's harbour, on the northwestern edge of the Grand Banks and has a 170 m water depth. In concert with the zooplankton sampling, CTD profiles are recorded, and samples for phytoplankton, nutrients, and extracted chlorophyll are collected using Niskin bottles at fixed depths. For phytoplankton analysis, subsamples from each depth are combined to give an integrated sample.

Zooplankton samples are split, and one-half is used for wet–dry weight determination. The other half is subsampled to give at least 200 organisms that are identified to genus or species and counted. Another subsample is taken containing at least 100 *Calanus* spp. that are identified to species and stage and counted. Biomasses of the dominant groups are calculated using dry weights of various groupings (e.g. *Calanus, Oithona, Pseudocalanus,* and *Metridia*) and abundance data.

Seasonal and interannual trends (Figure 4.1.2)

At Station 27, total copepod biomass varies seasonally between twofold and threefold, with higher values in autumn than in winter or spring. Interannual variations in total copepod biomass tend to mirror those of the large copepods (*Calanus* and *Metridia* spp.), which dominate the community by weight, but not numerically. The Arctic *Calanus* species, *C. glacialis* and *C. hyperboreus*, reproduce before the spring bloom, whereas the boreal form, *C. finmarchicus*, reproduces immediately before or during the bloom (Conover, 1988). Thus, the three *Calanus* species are most abundant shortly after the spring phytoplankton bloom. The two Arctic species disappear from the water column by July, whereas *C. finmarchicus* remains abundant throughout the autumn. The biomass of small copepods (*Oithona, Pseudocalanus, Centropages,* and *Temora* spp.) peaks in late autumn, reflecting the presence of large numbers of *Oithona* species. Overall, there are greater interannual variations in the biomass for the large copepods than for the smaller species.

The seasonal cycle in local *in situ* 0–50 m temperatures differs somewhat from the Hadley SST, although the general pattern in interannual variability is similar. The differences reflect both the wide area of the continental shelf represented in the Hadley estimates relative to the more local measurements taken at Station 27, which is located in the inshore arm of the Labrador Current, and the fact that the 0–50 m depth range includes a seasonally varying proportion of water from the cold intermediate layer, with temperatures close to 0°C. Similarities in interannual variations are the result of large decorrelation scales for SST anomalies in the region (Ouellet *et al.*, 2003). Since 1999, the annual average abundance of *Metridia* spp. has increased significantly at Station 27, while that of *Temora longicornis* and the annual average integrated chlorophyll concentration have both decreased significantly. Other taxa have shown non-significant or no trends. In 2008, the abundances of all three *Calanus* species and those of the smaller copepods *Oithona, Pseudocalanus,* and *Temora* spp. were very low, but thereafter, the abundance of *C. finmarchicus* , *C. hyperboreus,* and *Oithona* spp. increased to above-average levels. The abundances of the small copepods *Oithona* spp. and *Pseudocalanus* spp. were at

peak or near-peak levels in 2010, while those of the warm-water species *Centropages* spp. and *Temora longicornis* were below average. Recently, there has been a noted change in the phenology of *C. finmarchicus* and *Pseudocalanus* spp. at Station 27. Since 2005, a greater proportion of C5 copepodites of both species appear to be molting to adulthood during autumn, leading to changes in the relative abundances of adults in spring.

More detailed ecosystem status reports on the state of chemical and biological oceanographic conditions in the Newfoundland and Labrador region (Canadian Atlantic waters) are prepared every year as Science Advisory Reports or Research Documents.

These reports are available online at: http://www.isdm-gdsi.gc.ca/csas-sccs/applications/publications/index-eng.asp.

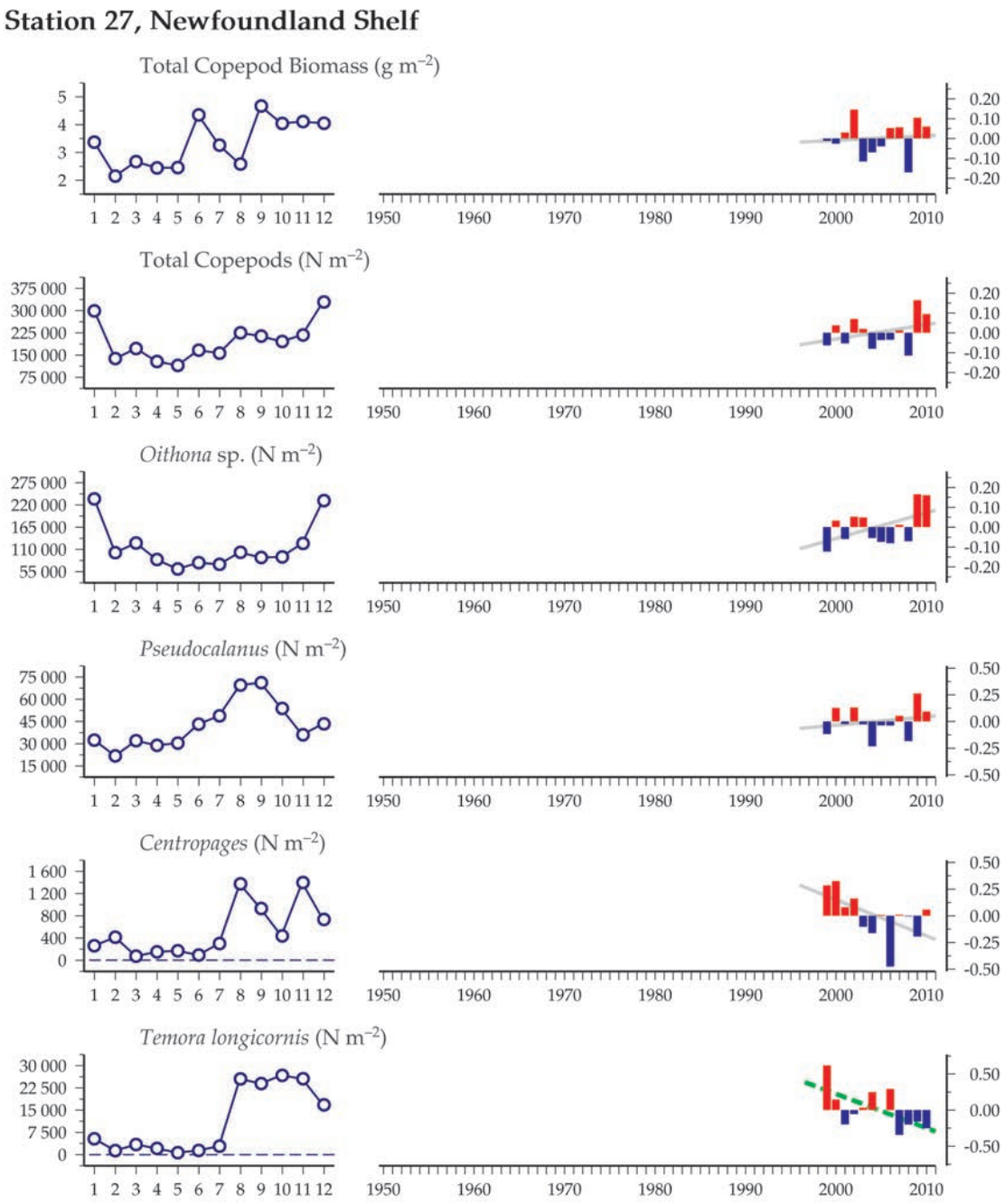
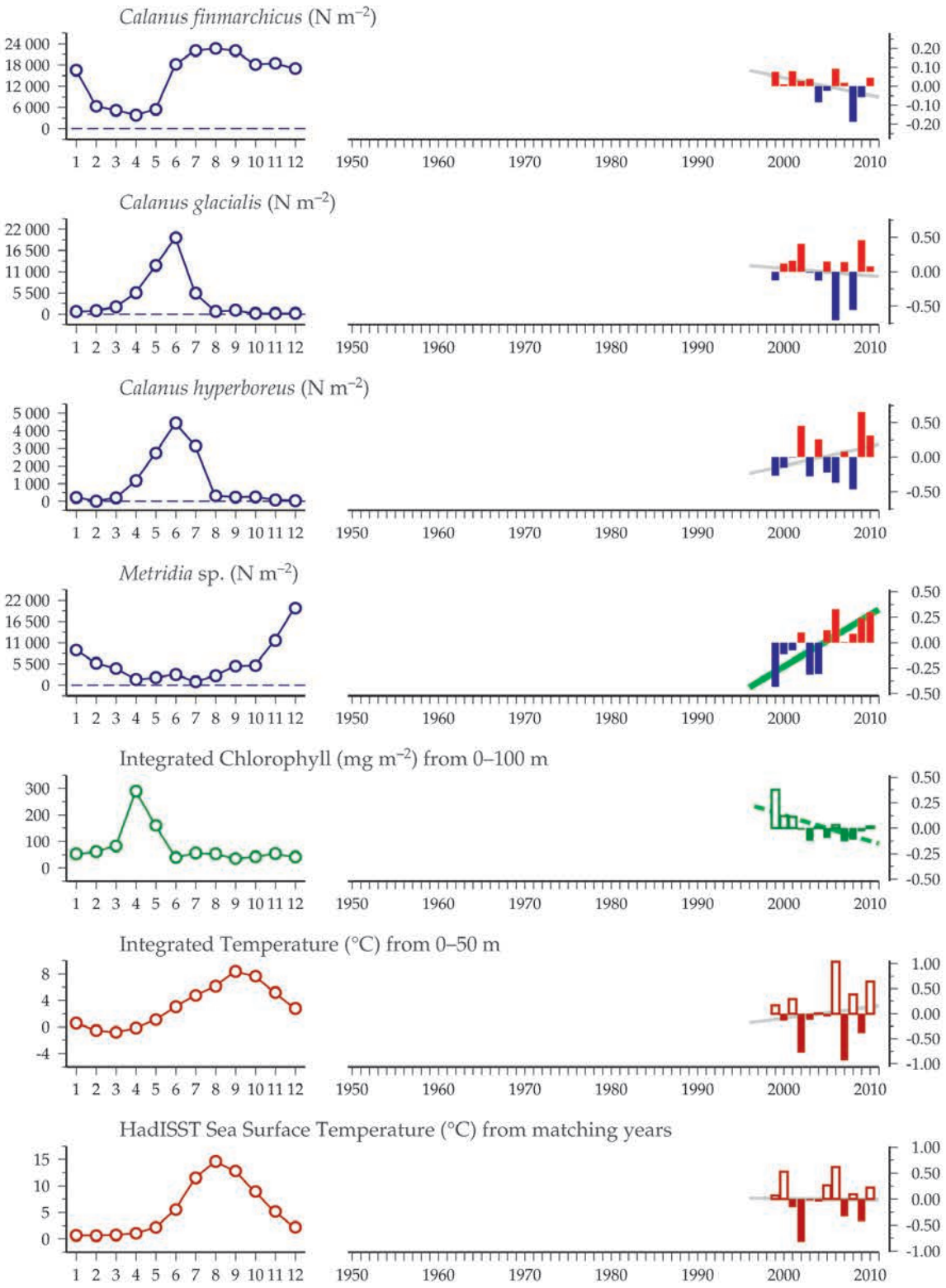


Figure 4.1.2
Multiple-variable comparison plot (see Section 2.2.2) showing the seasonal and interannual properties of select cosampled variables at the Station 27 monitoring area.

Additional variables are available online at: http://WGZE.net/time-series.

Figure 4.1.2
continued



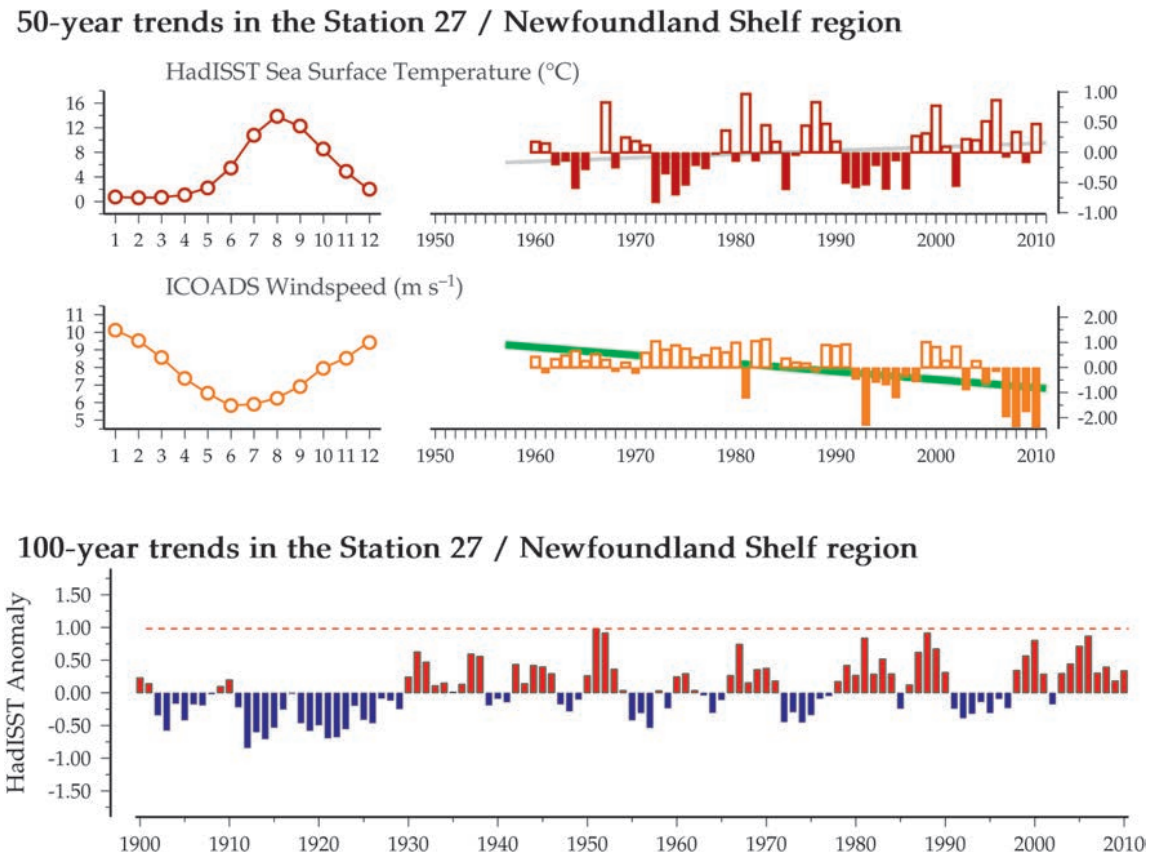


Figure 4.1.3
Regional overview plot (see Section 2.2.3) showing long-term sea surface temperatures and wind speeds in the general region surrounding the Station 27 monitoring area.