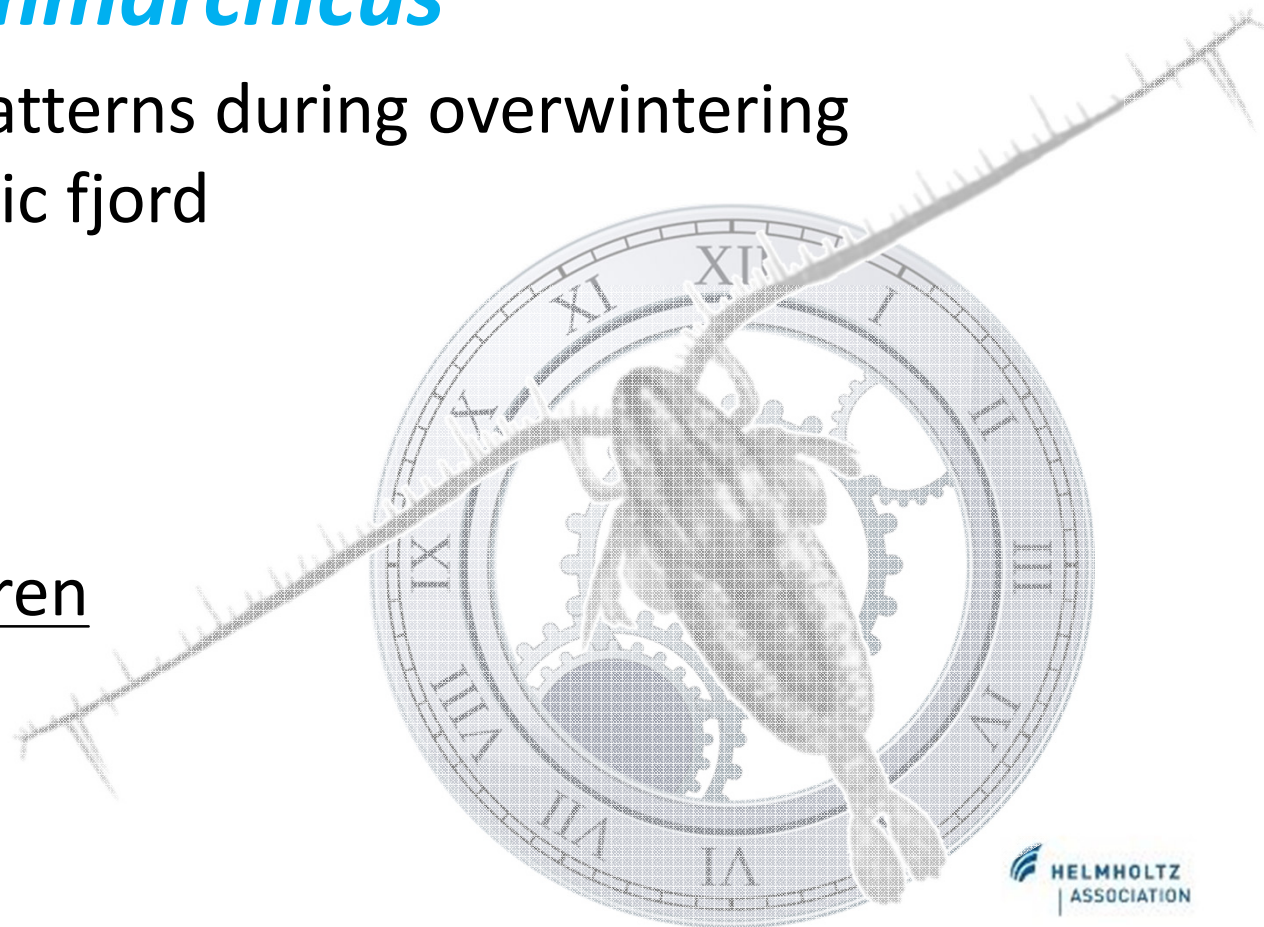


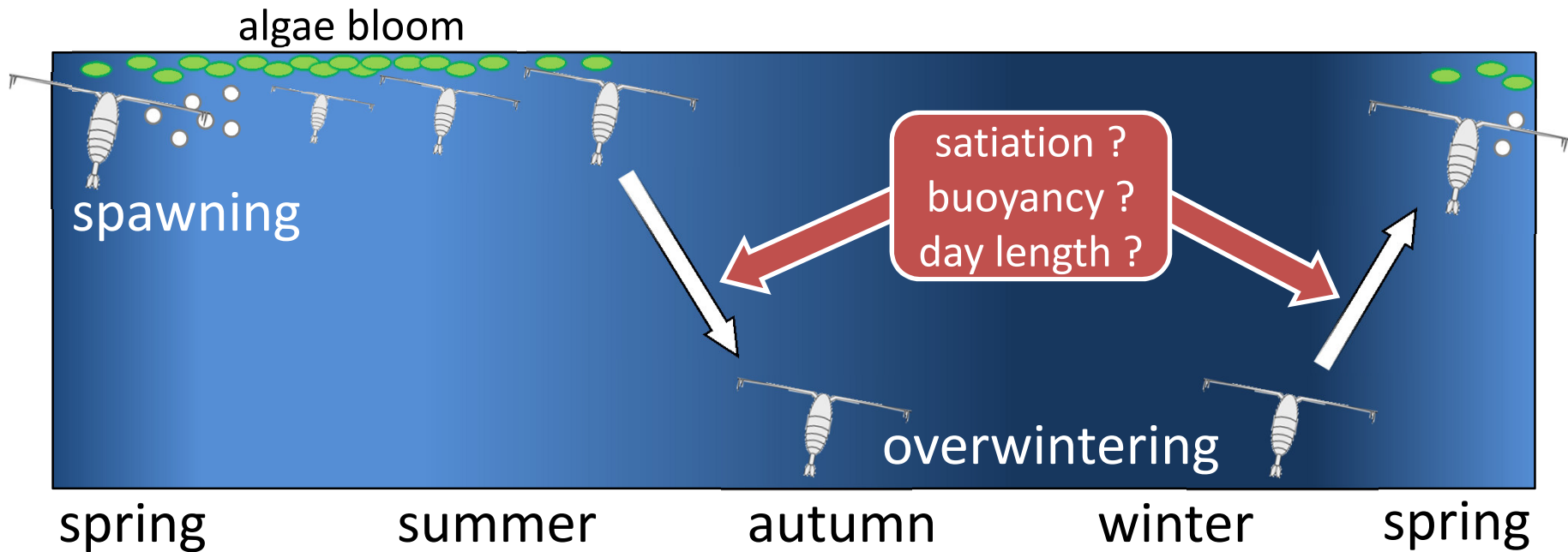
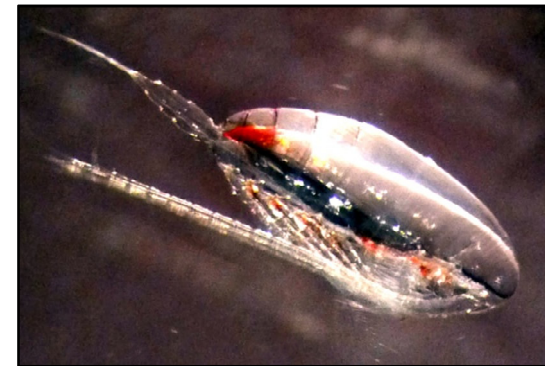
First records of clock gene activity in *Calanus finmarchicus*

Expression patterns during overwintering
in a high Arctic fjord

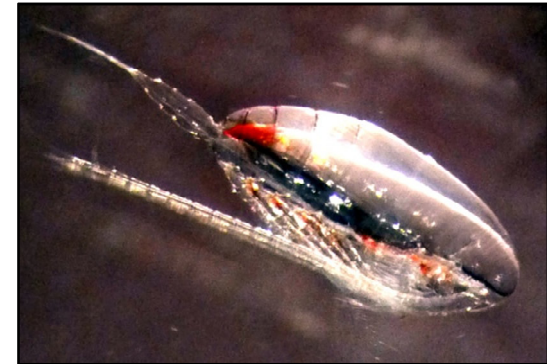
Häfker, N. Sören
Schoenle, A.
Meyer, B.
Teschke, M.



- Northern Atlantic **key species**
- **Diel** vertical migration
- **Seasonal** cycle → overwintering

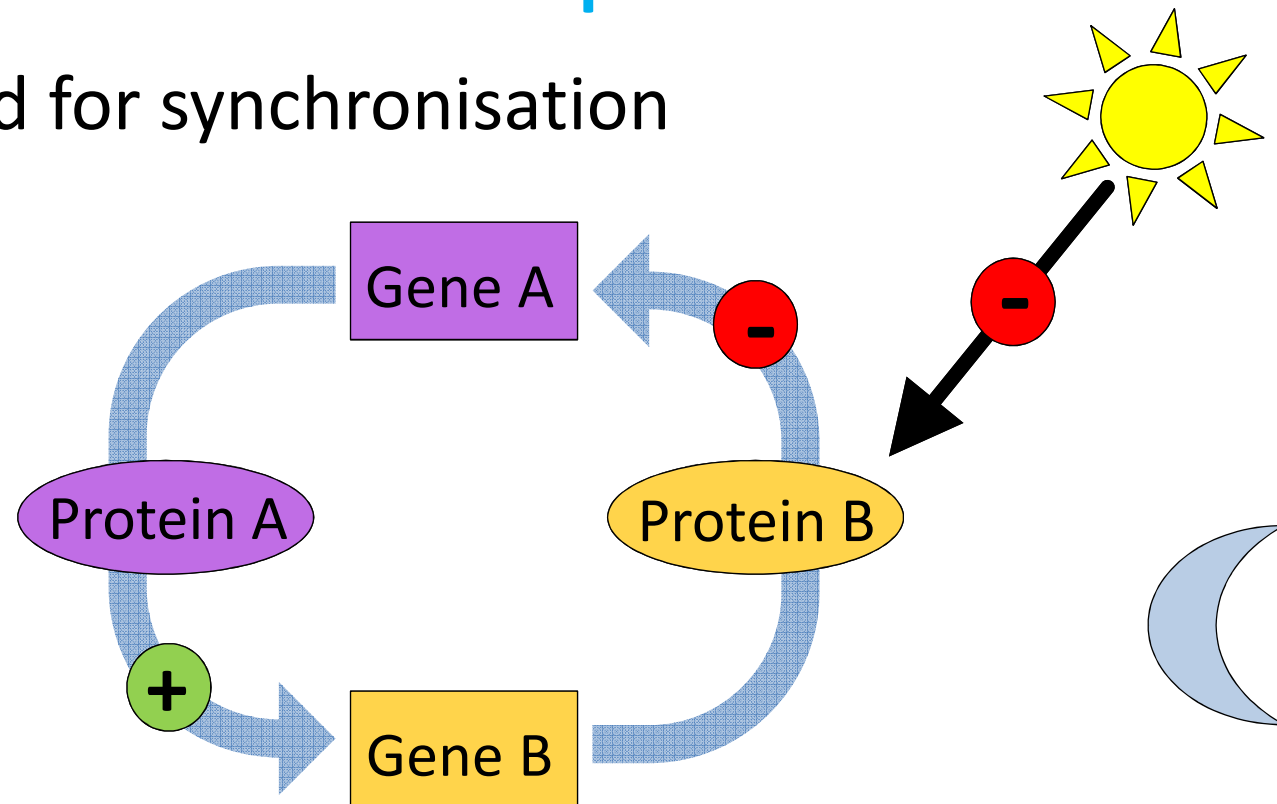


- Northern Atlantic **key species**
- **Diel** vertical migration
- **Seasonal** cycle → overwintering

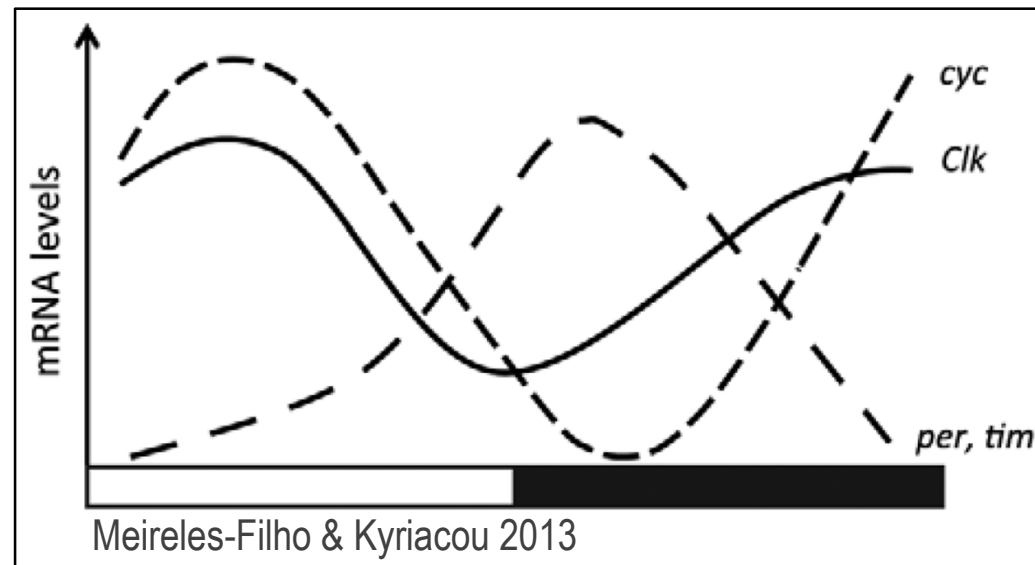


**A highly rhythmic animal !
How are these rhythms regulated ?**

- Create cycle of **~24h**
- Gene/protein **feedback loops**
- **Light** used for synchronisation



- **Diel** expression patterns
- Peak activities often at **sunrise/sunset**



**Regulation of diel cycles.
Measurement of day length.**

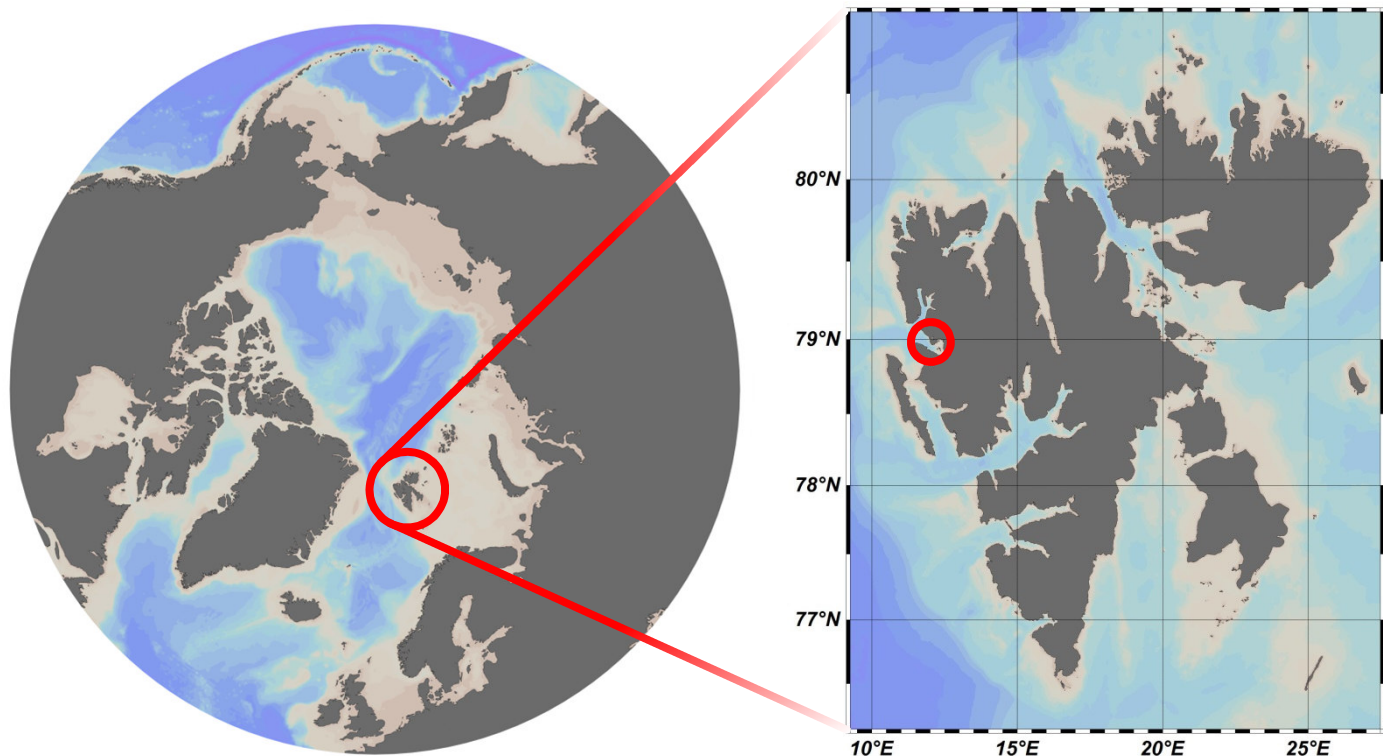
Objectives



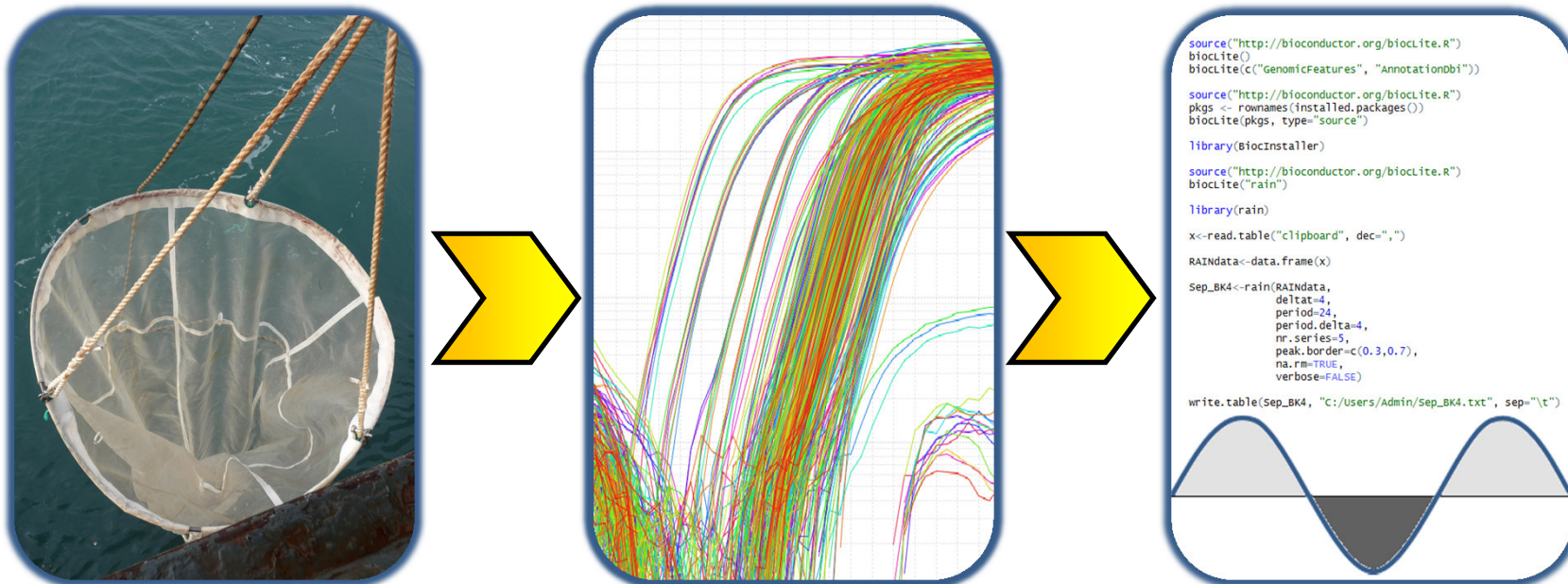
- Is there **rhythmic clock gene expression** in *C. finmarchicus* ?
- How does it change over the course of **overwintering** ?
- How does the clock react to **constant darkness** (polar night) ?

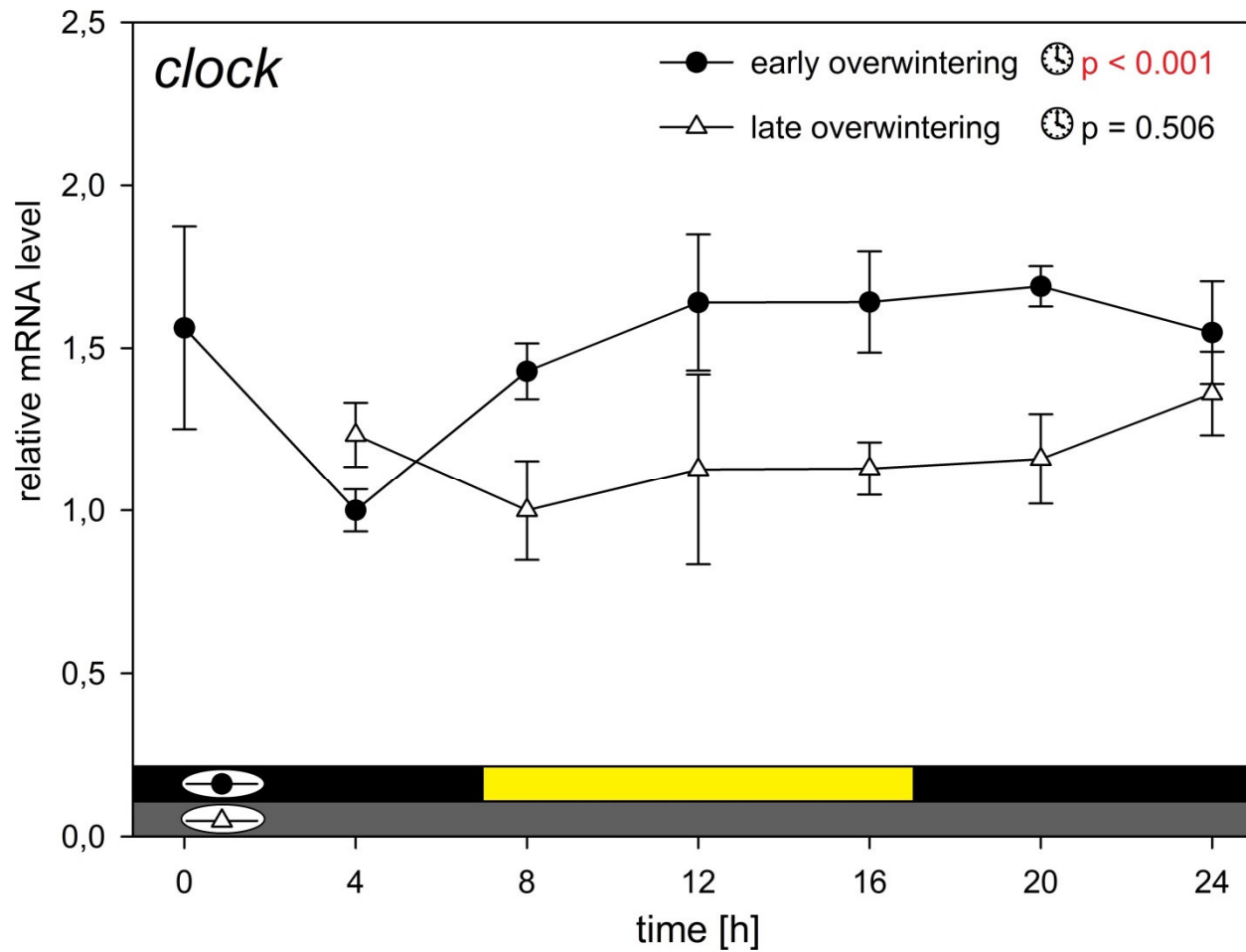
Kongsfjorden, Svalbard (**79°N**, **12°E**):

- **Early** overwintering (Sep 2014)
- **Late** overwintering, **polar night** (Jan 2015)

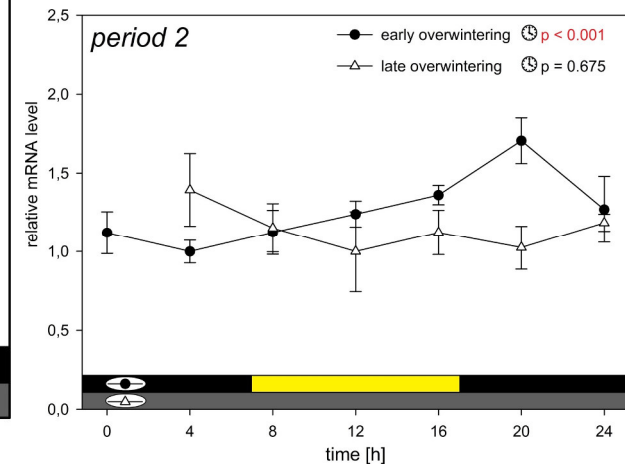


- **24h** sampling, 4h intervals, bottom-200 m
5 replicates per time point / 15 copepods per replicate
- RNA of **9 clock genes** measured by Taqman[®] **qPCR**
- **Rhythm** analysis via R-package “**RAIN**”

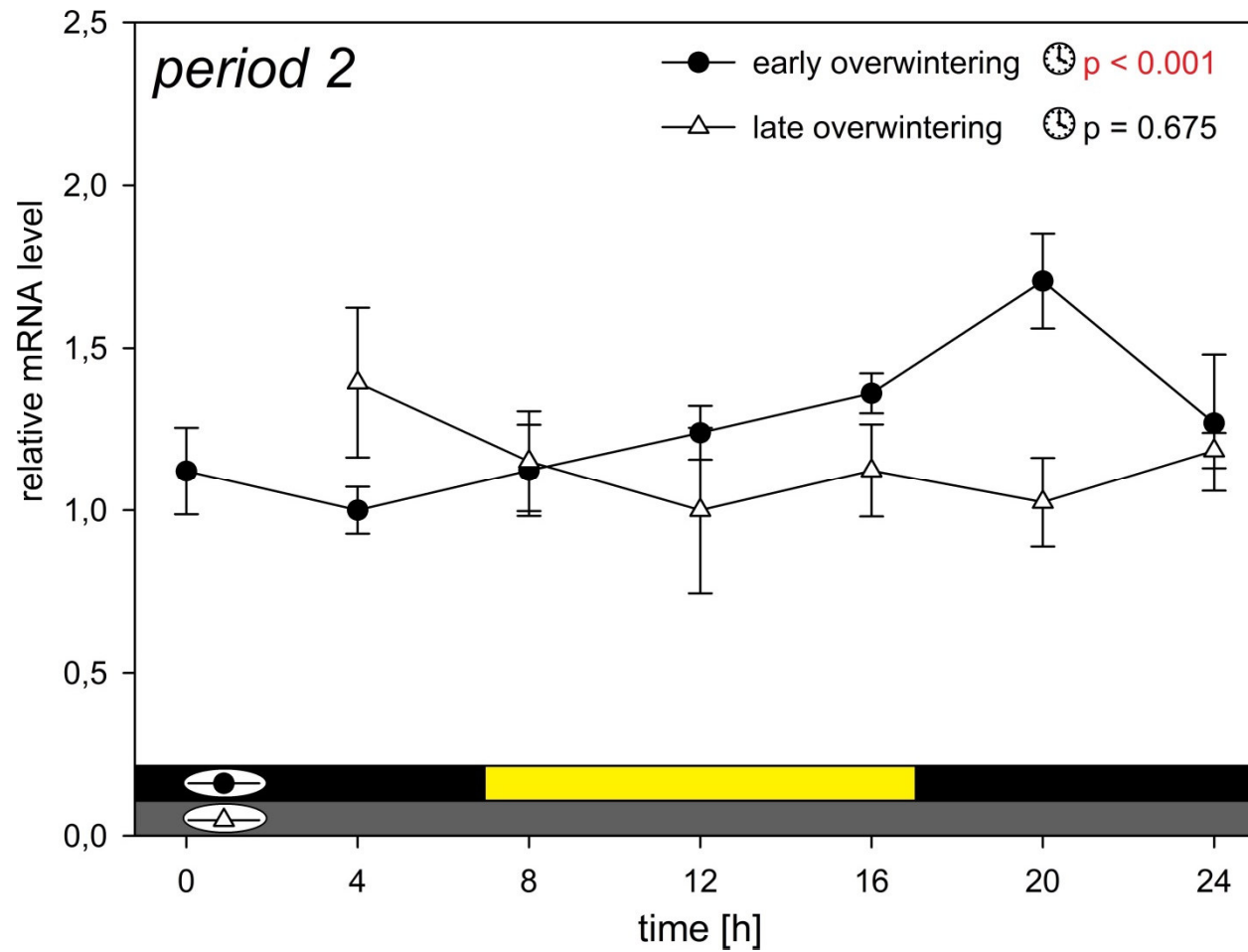




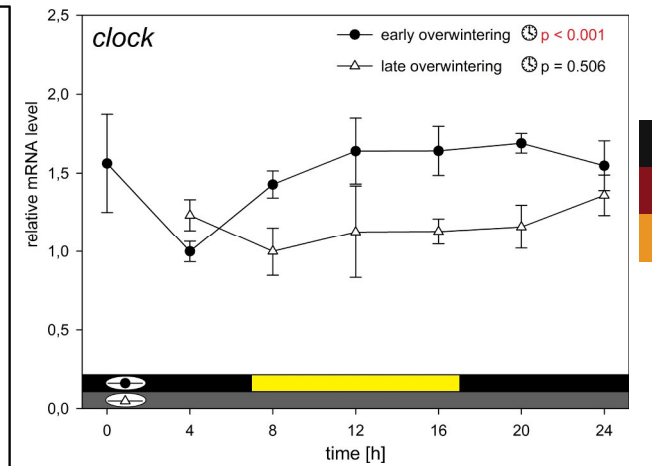
mean $\pm$ SE



Results



mean $\pm$ SE



Early overwintering:

- Significant **24h rhythm** in **6 genes** (out of 9)
- Most peaks at **sunrise/sunset**

Late overwintering (polar night):

- **Rhythmicity** is **lost**

- **Rhythmic** clock gene **expression** in *Calanus finmarchicus*
→ indicates clock existence
- **Rhythmicity diminishes** during polar night
→ light needed for synchronization?