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Ultradian rhythms under extreme conditions

Analysis of activity rhythms during sleep in submariners

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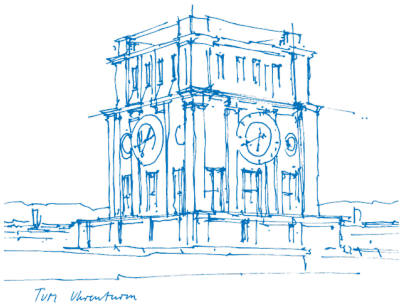

What are ultradian rhythms and why do they matter?

- In chronobiology, ultradian rhythms are rhythms with a period of < 24 h. While most research focuses on circadian rhythms (period ≈ 24 h), ultradian rhythms are less well studied and understood.
- Ultradian rhythms can be found, for example, in movement during sleep and switching between sleep stages. So far, they have hardly been studied under extreme conditions, such as low light and low activity levels combined with shift work, as seen in data from a submarine mission.
- Analysing the submariners' data, we want to find out how their sleep varies between the mission and the pre- and post-mission. post-mission periods. To this end, we want to study their sleep activity rhythms and determine whether they are linked to sleep quality or sleepiness.

Goals and challenges of the project

- Work with real-life data $\rightarrow$ data cleaning
- Applying this data to the existing framework as the locomotor inactivity during sleep (LIDS)
- Find or adapt mathematical methods to detect rhythms
  (Wavelets, Singular spectrum analysis, Hidden Markov models, etc.)
- Statistical testing of the results