Pan-Arctic trends of aerosol particle number concentrations in different size fractions

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Objective

- Understanding the direction and magnitude of recent changes in Pan-Arctic aerosol populations

Methods & Sites

▪Period: 2010-2018 (Alert 2011-2019)

▪Size fractions:
- Nucleation: 10-35 nm
- Aitken: 35-80 nm
- Accumulation: 80-300 nm

▪Sites (Fig. 1):
- High Arctic: Alert, Villum, Zeppelin
- Continential: Pallas

▪Data was prewhitened via 3PW method (Collaud Coen et al., 2020)

▪Slope and significance calculated using Theil Sen Estimator and Mann-Kendall (90th % CL)

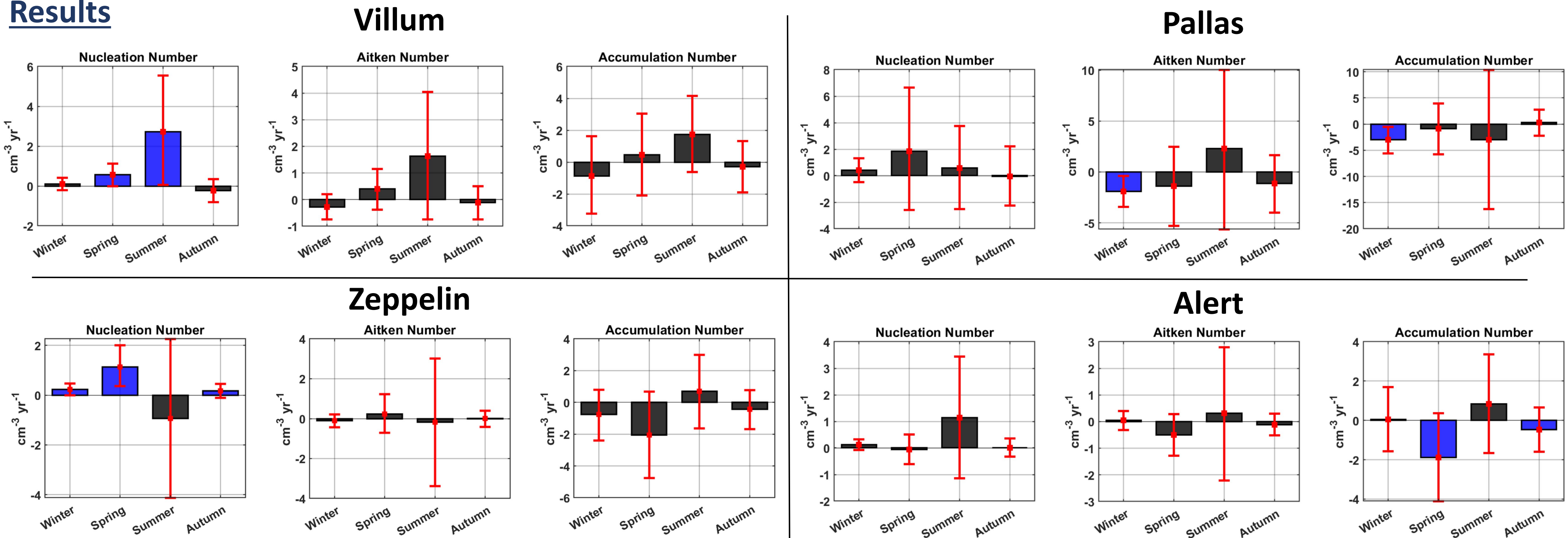**Figure. 1.** Map of stations used in this study

Results

Figure 2. Seasonal trends for the size fractions at Villum (top left), Pallas (top right), Zeppelin (bottom left), and Alert (bottom right). Blue Bars are statistically significant at the 90th % CL, while black bars are not. Red error bars the 95th % confidence limits.

- **Increase of Nucleation at Villum due to changing transport patterns (Pernov et al., 2022 under review)**

- **Possible decrease in Arctic Haze at Alert?**

- **Increases at Zeppelin possibly due to increasing time air masses spent over open water, increasing precipitation, or changing transport patterns? (Heslin-Rees et al., 2020)**

- **No similar pattern for seasonal trends other than Nucleation at Villum and Zeppelin in spring.**