Possible wave climate changes in the Beaufort and Chukchi Seas under warming climate change scenarios

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What are the objectives of the project?

1. Models and areas of interest
2. Impacts of climate change
3. Results

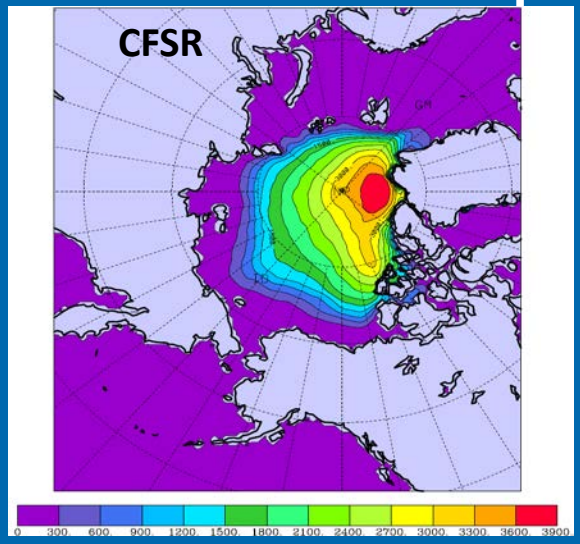
Methodology

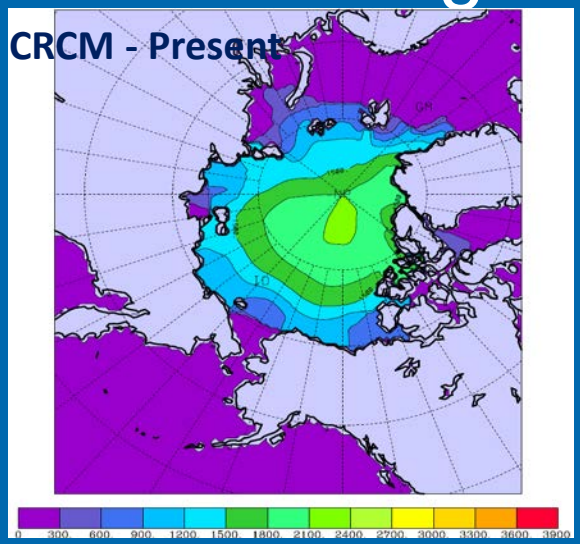
- Impact of climate change on Arctic storms and waves
- Downscaling simulations were performed with the Canadian Regional Climate Model (CRCM) driven by the Canadian 3rd Generation Coupled Global Climate Model (CGCM3.1) using IPCC 20C3M (1970-1999) and SRES A1B scenario emissions (2040-2069)
- Composite analysis of the most intense cyclones were also analyzed.
- Estimates of present and future wave climate are presented.

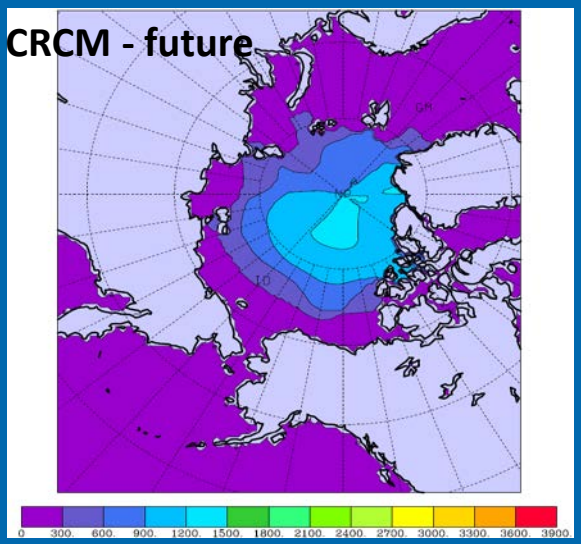
Conclusions

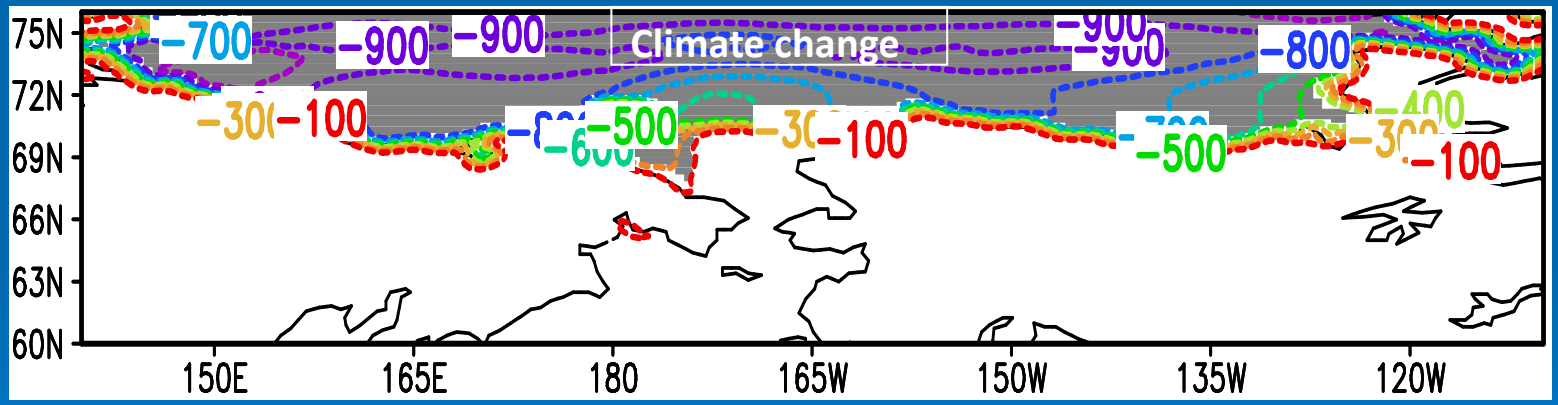
1. Sea ice is retreating
2. Larger open water areas for waves to grow in future climate change scenario
3. Stronger winds in the Beaufort – Chukchi Seas
4. Stronger waves
5. Effects of ‘no ice’ simulation similar to actual downscaling run via CGCM/CRCM
6. Upper atmospheric effects less important (not shown here)

Sea ice – September averages



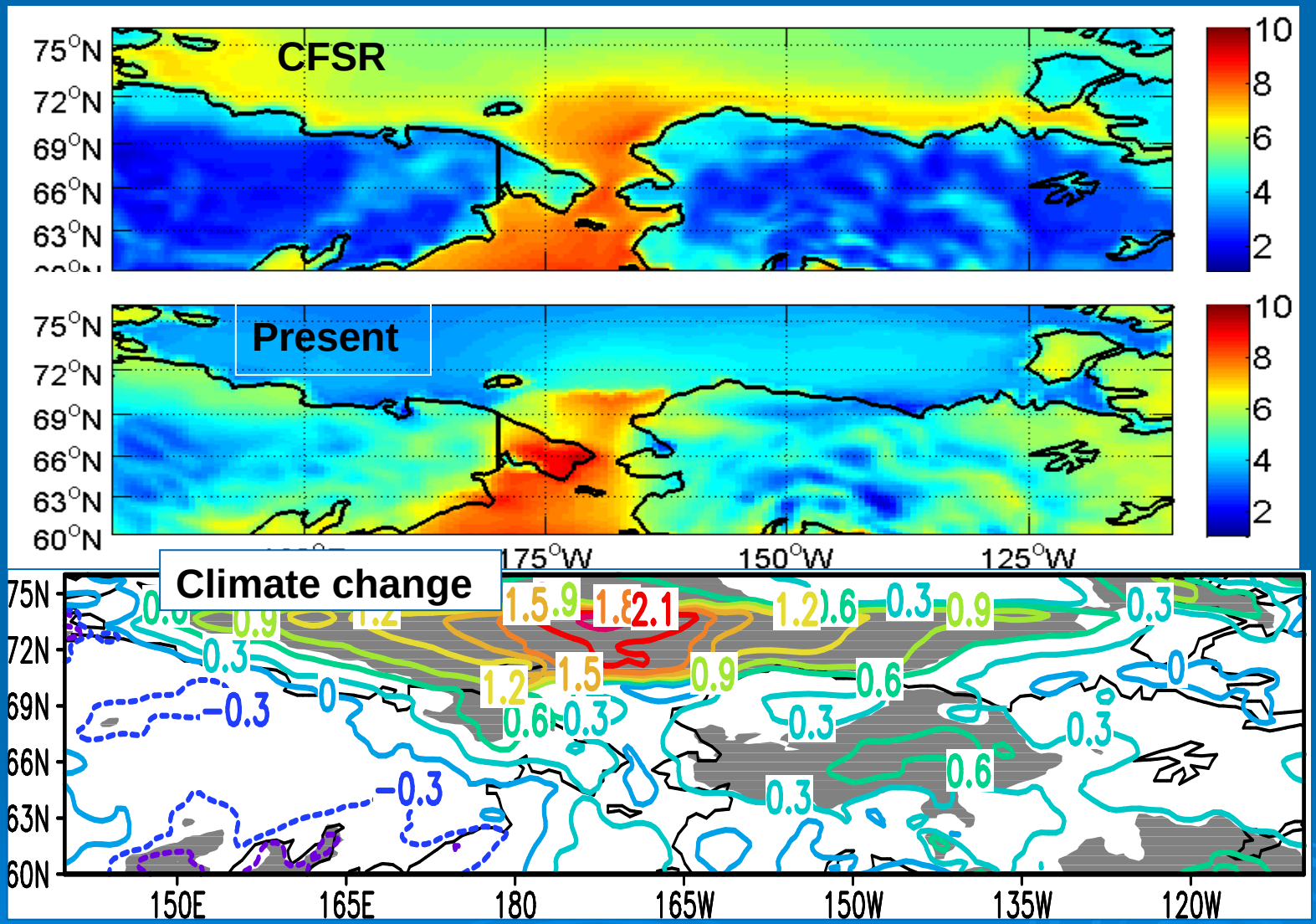






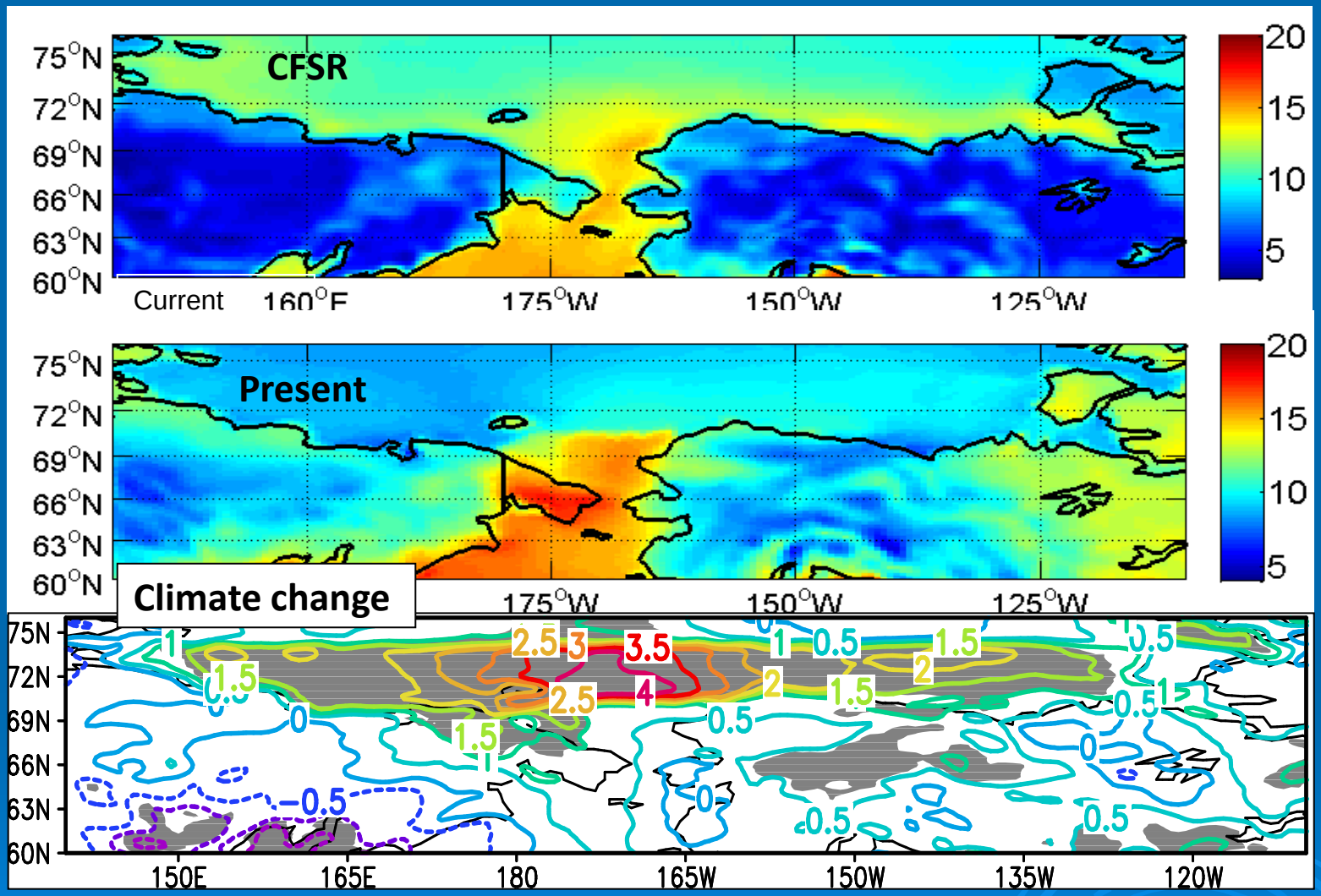
Sea ice volume, interpolated from CGCM3 outputs.
(units: kg/(m*m))

Summer mean winds - September



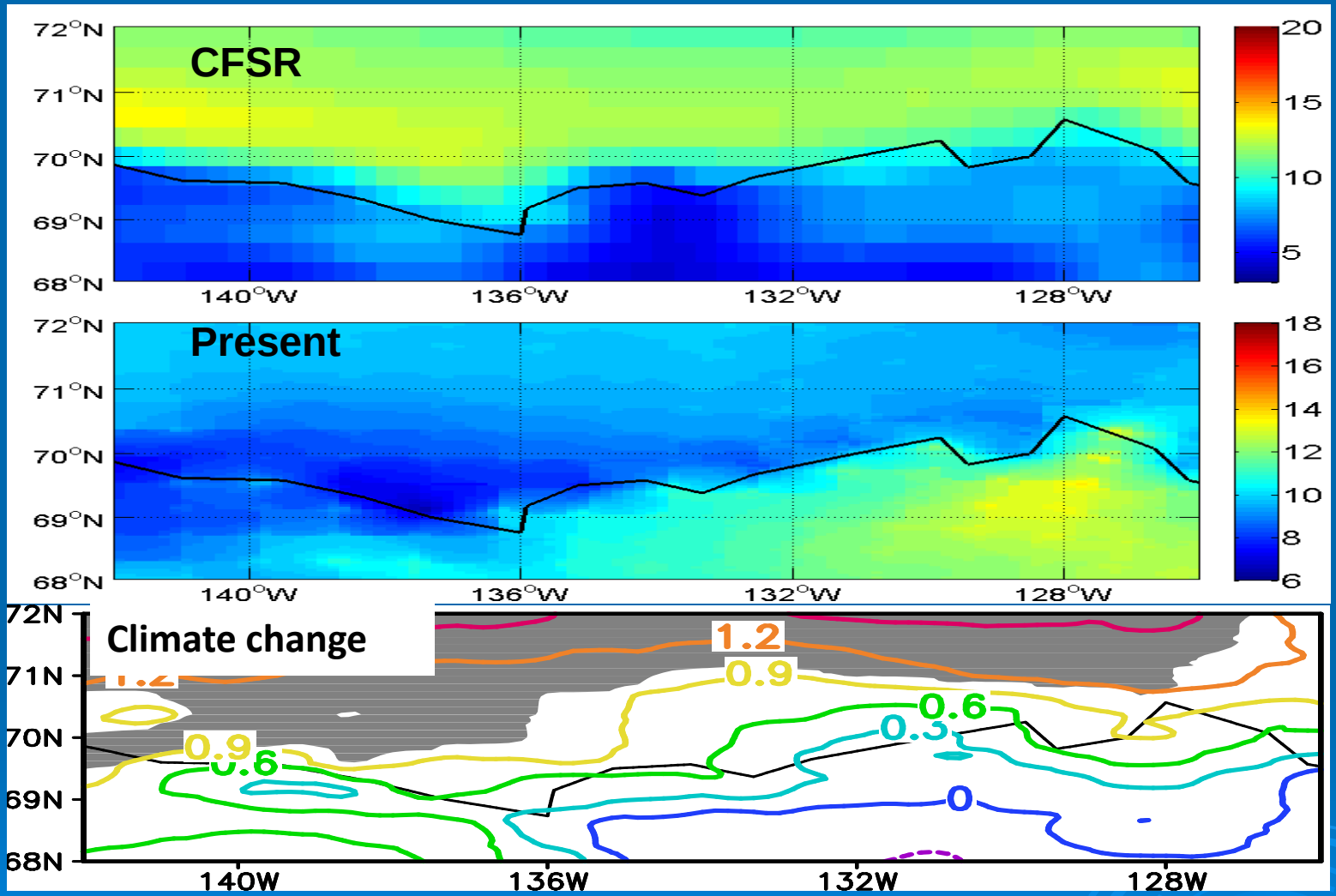
September mean wind speed for the current climate (1970-1999) and climate change (2040-2069 – 1970-1999). (Unit: m/s)

Summer 10% strongest winds - September



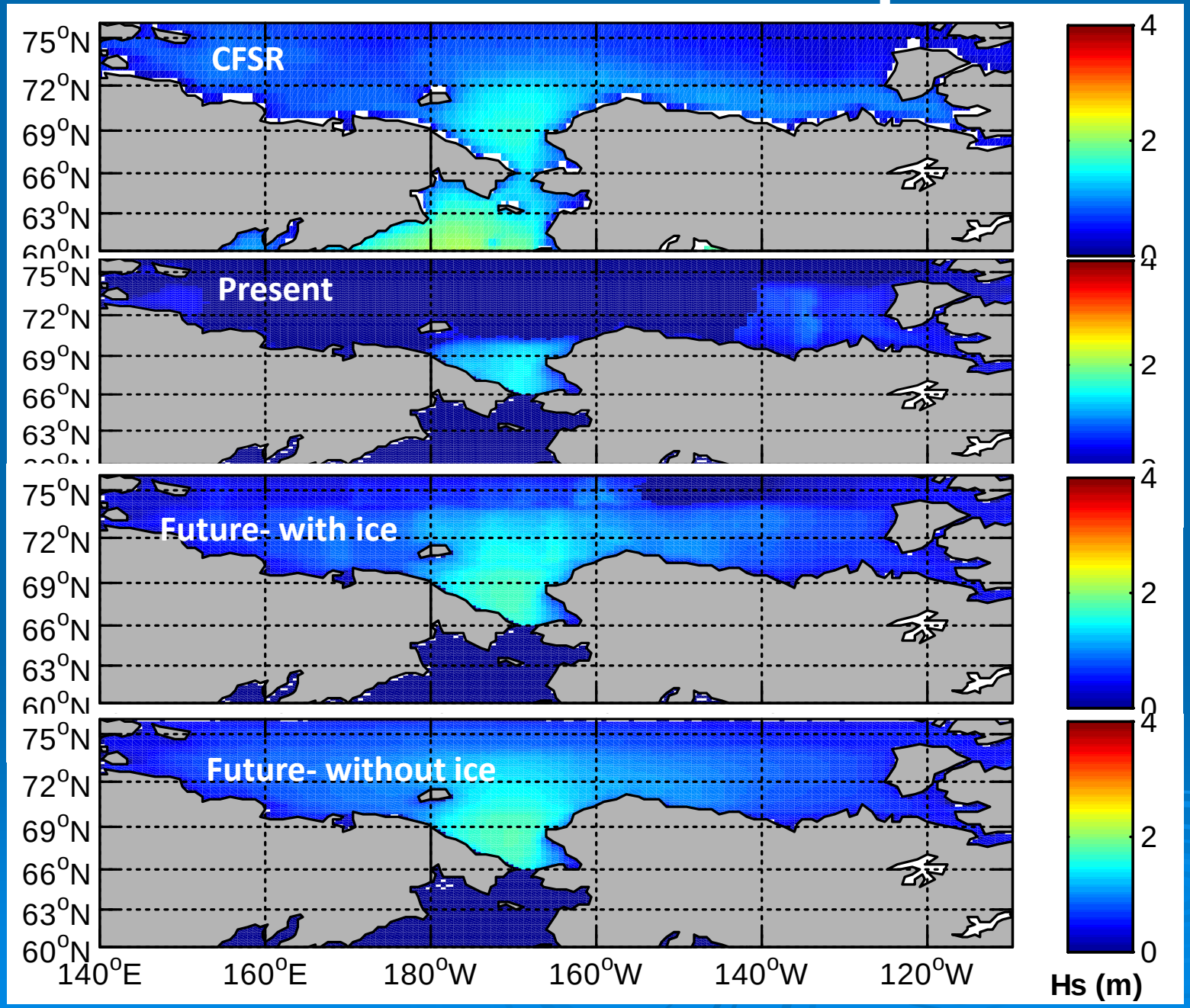
September 10% strongest winds for current climate (1970-1999) and climate change (2040-2069 – 1970-1999). (Unit: m/s)

Summer 10% strongest winds – Beaufort Sea



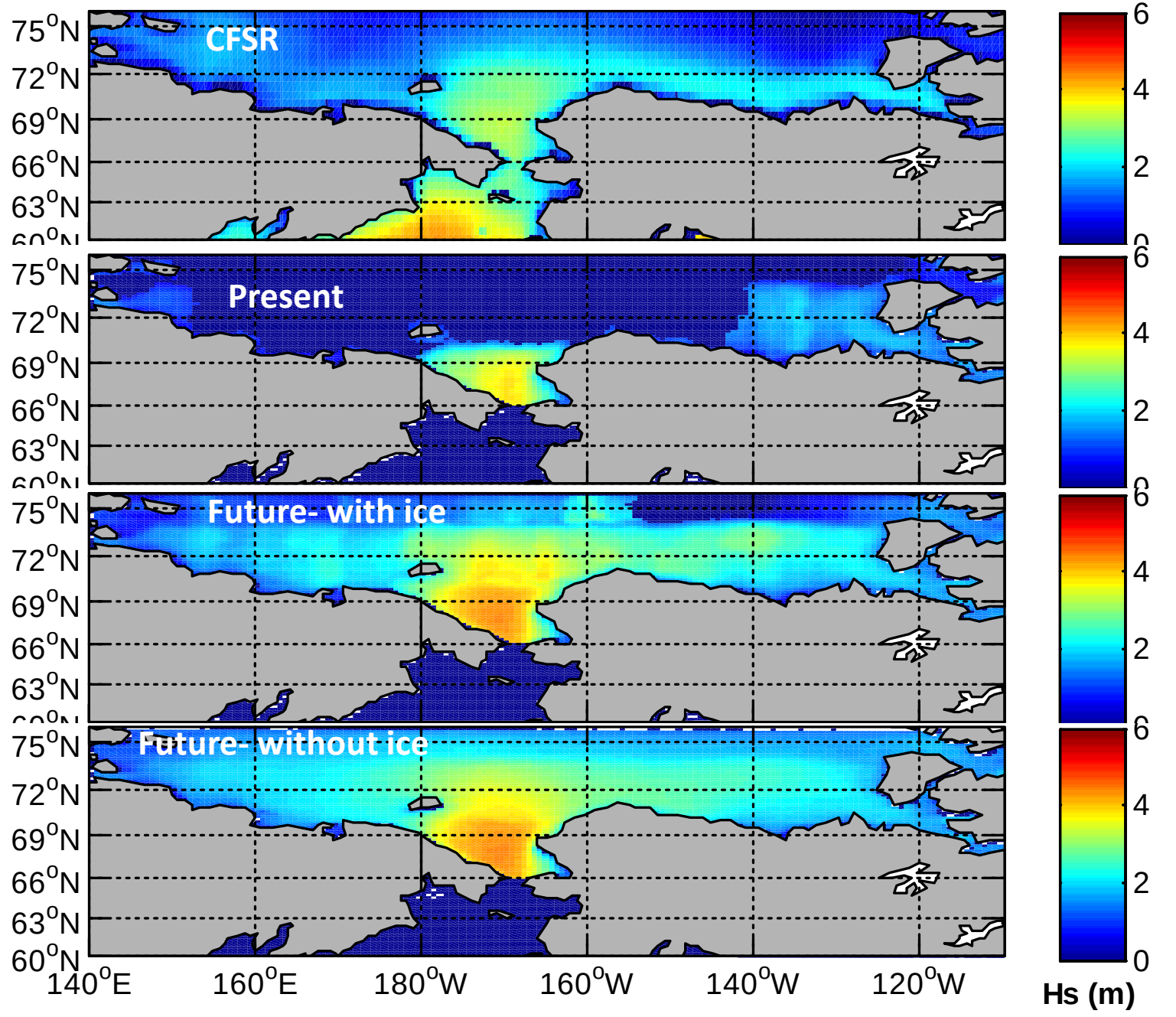
September 10% strongest winds for the current climate (1970-1999) and climate change (2040-2069 – 1970-1999). (Unit: m/s)

Summer mean waves - September



September mean significant wave heights the Present climate (1970-1999) and Climate change (2040-69 – 1970-99). (Unit: m)

Summer 10% strongest waves - September



September 10% strongest significant wave heights the Present climate (1970-1999) and Climate change (2040-69 – 1970-99) (Unit m)

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