Relationships between ocean heat transport (OHT) and Arctic sea ice

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and PRIMAVERA partners
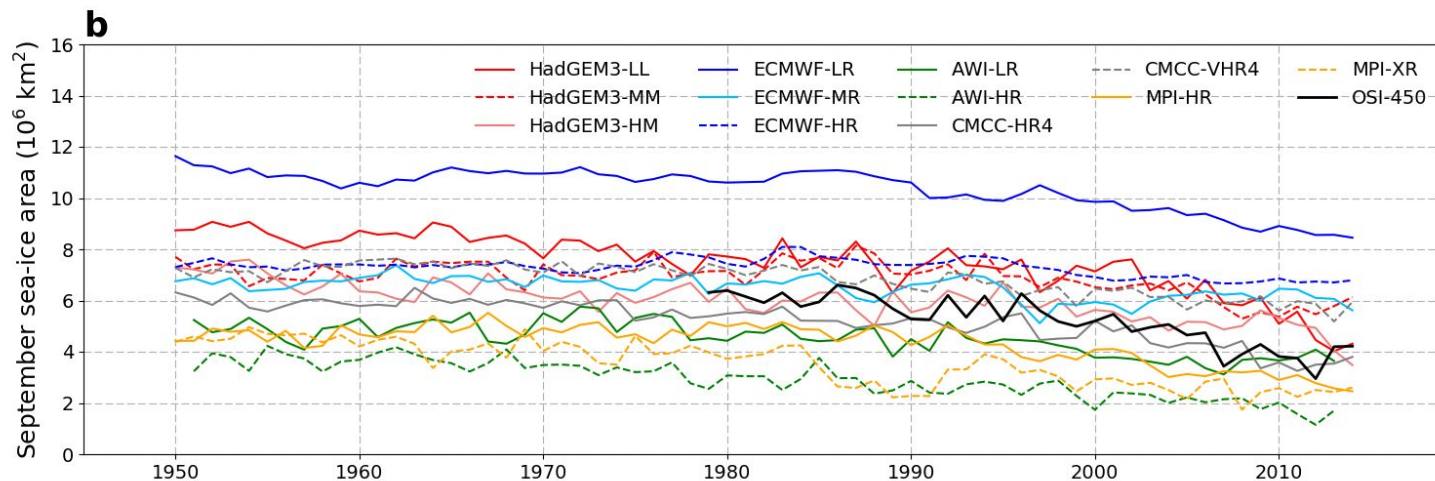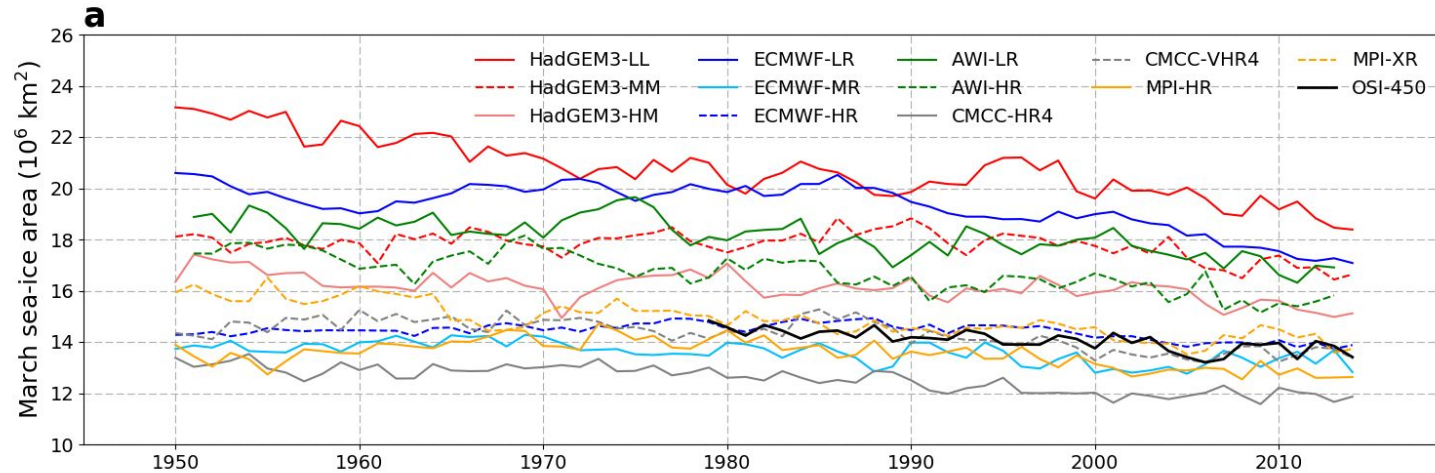
Decline of Arctic sea-ice area/volume

Coupled Stream 1 hist-1950

MARCH 1979-2014
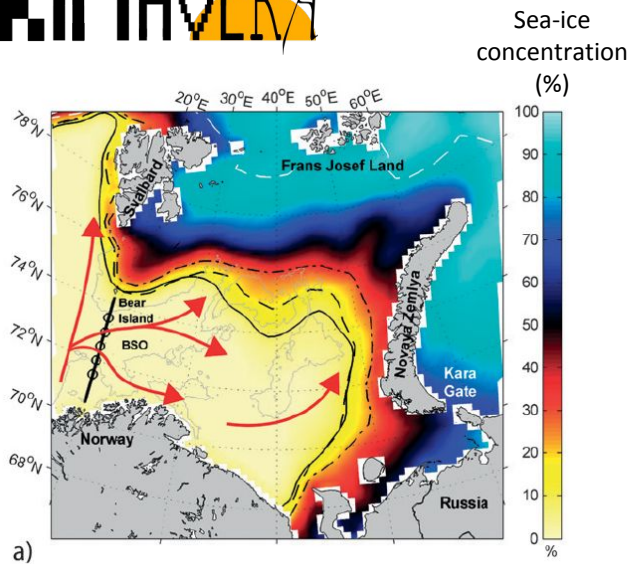Observed trend = -29,000 km²/a
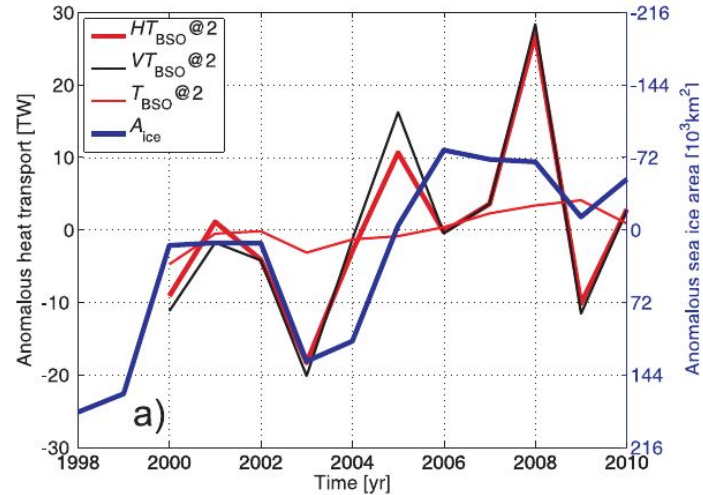Modelled trend = -17,000 to -88,000 km²/a

SEPTEMBER 1979-2014
Observed trend = -80,000 km²/a
Modelled trend = -20,000 to -84,000 km²/a

Increase of Atlantic OHT

Sea-ice concentration (%)
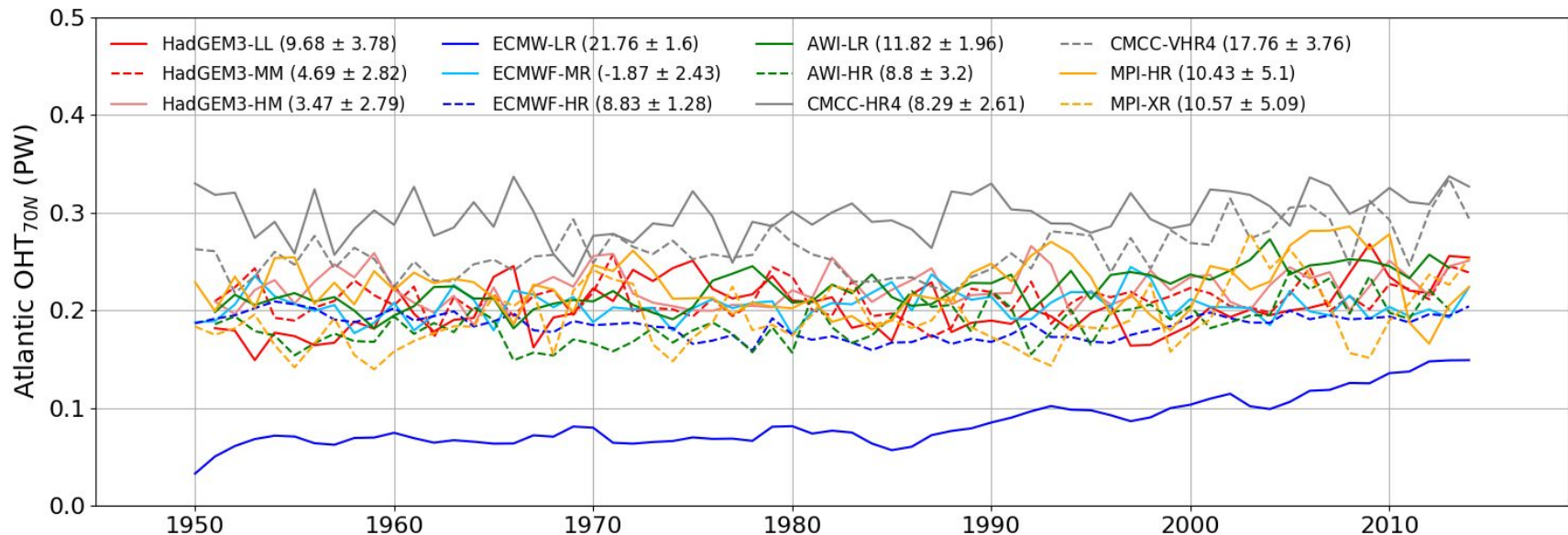
Arthun et al. (2012), Barents Sea

Arthun et al. (2012), Barents Sea

Coupled Stream 1 hist-1950 runs

1979-2014
Modelled trend = -1.87 to +21.76 PW/decade

Legend:
- HadGEM3-LL (9.68 ± 3.78)
- HadGEM3-MM (4.69 ± 2.82)
- HadGEM3-HM (3.47 ± 2.79)
- ECMW-LR (21.76 ± 1.6)
- ECMWF-MR (-1.87 ± 2.43)
- ECMWF-HR (8.83 ± 1.28)
- AWI-LR (11.82 ± 1.96)
- AWI-HR (8.8 ± 3.2)
- CMCC-HR4 (8.29 ± 2.61)
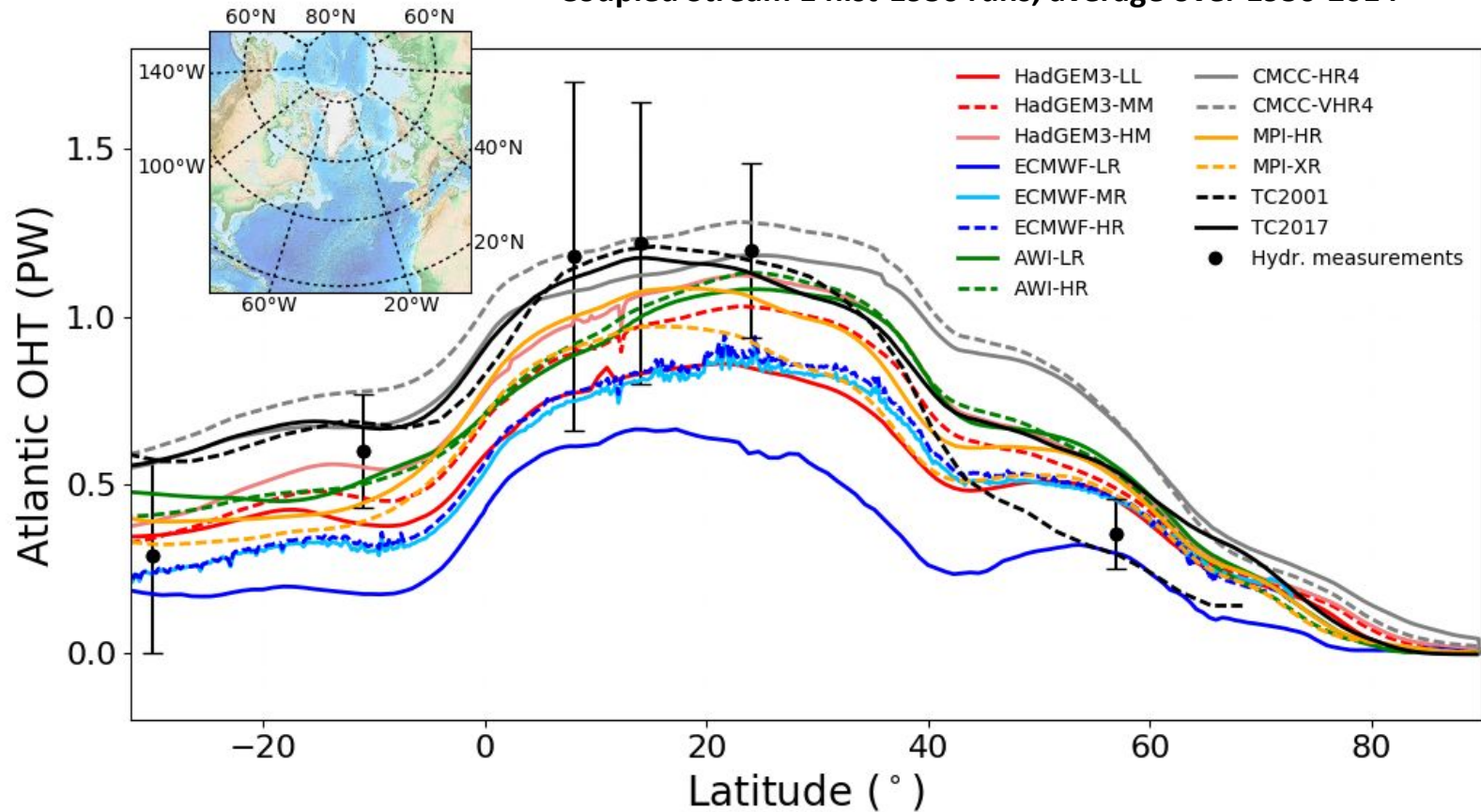- CMCC-VHR4 (17.76 ± 3.76)
- MPI-HR (10.43 ± 5.1)
- MPI-XR (10.57 ± 5.09)

Arctic sea-ice area and volume decrease with higher ocean resolution

Coupled Stream 1 hist-1950 runs, average over 1979-2014

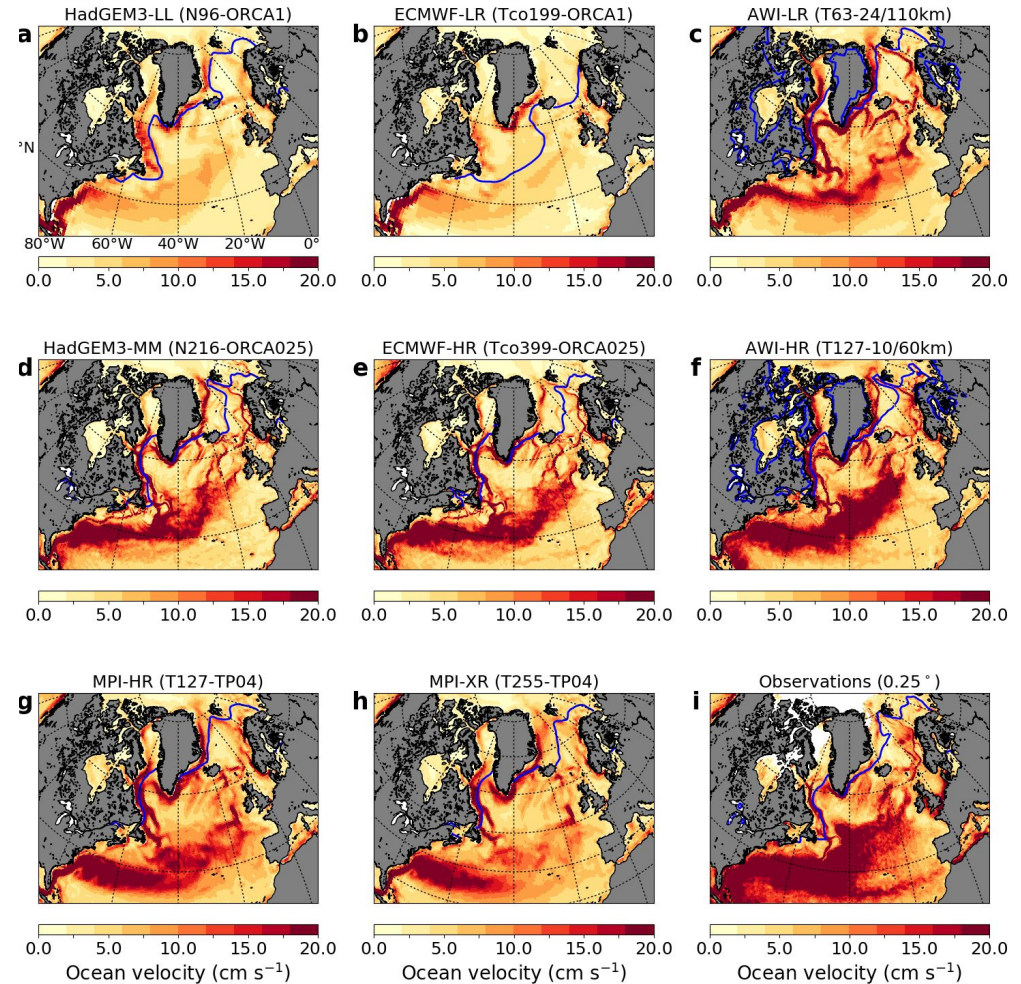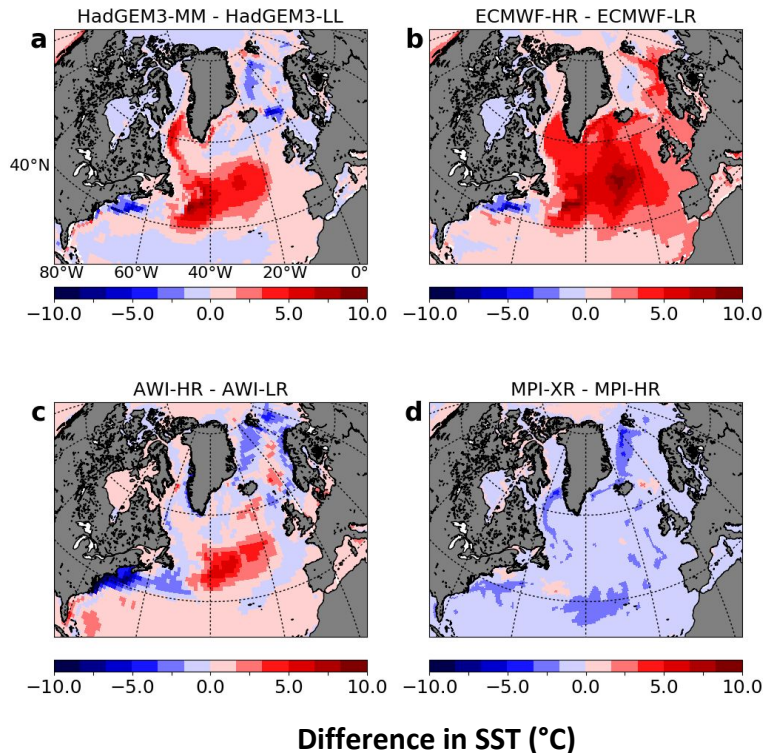Docquier et al. (in review)
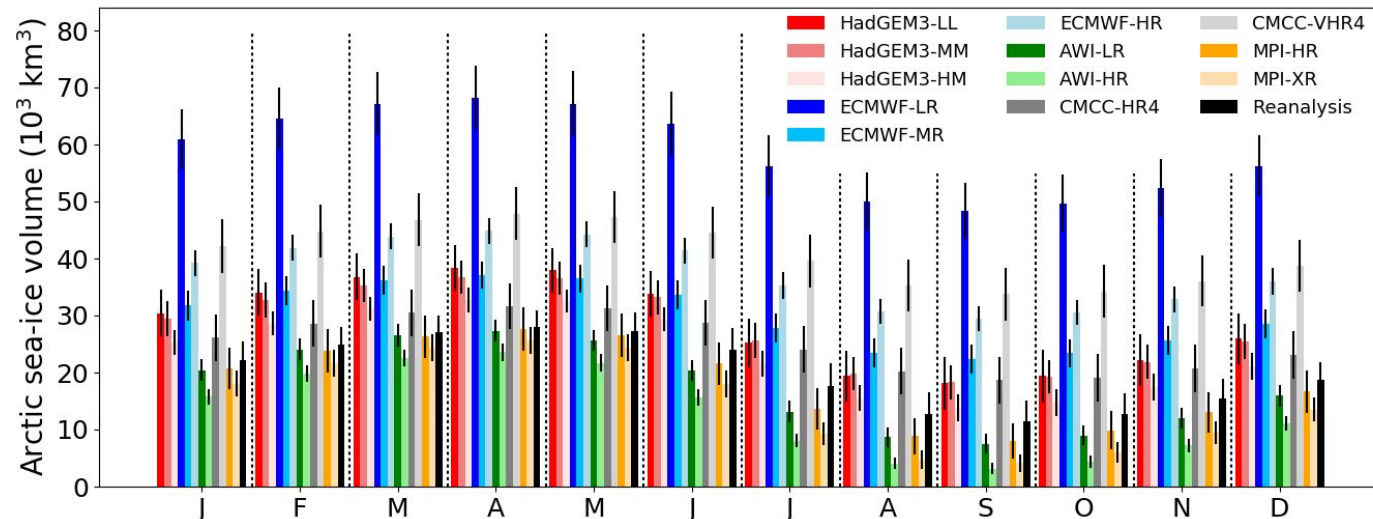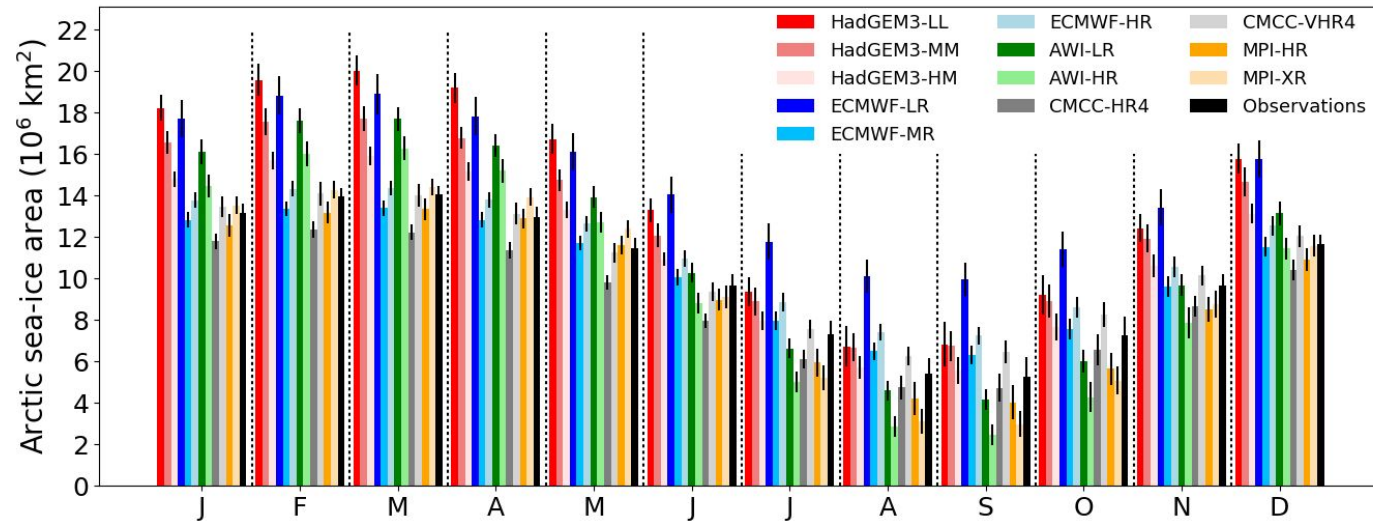
Atlantic OHT increases with higher ocean resolution

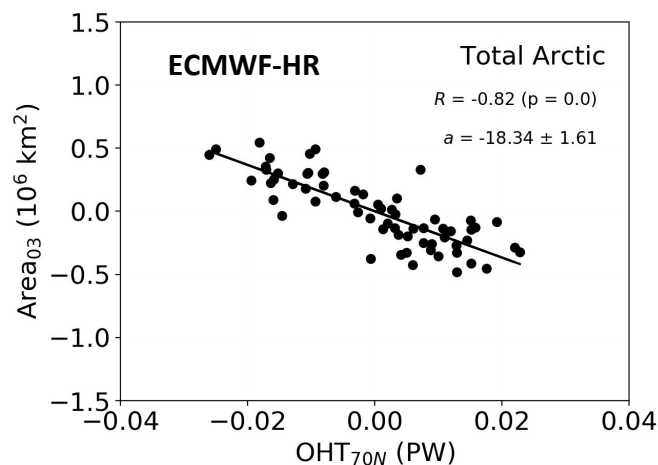**Coupled Stream 1 hist-1950 runs, average over 1950-2014**

Docquier et al. (in review)

Ocean surface temperature and velocity increase with higher ocean resolution

Coupled Stream 1 hist-1950 runs, average over 1982-2014

Difference in SST (°C)

Docquier et al. (in review)

Arctic sea-ice area/volume decreases with increasing Atlantic OHT at 70N

Figs. on the right: Regression slopes between detrended March Arctic sea-ice area and Atlantic OHT at 70N (coupled Stream 1 hist-1950 runs, computed over 1950-2014)

Docquier et al. (in review)