Meridional Energy Transport from Midlatitudes towards the Arctic

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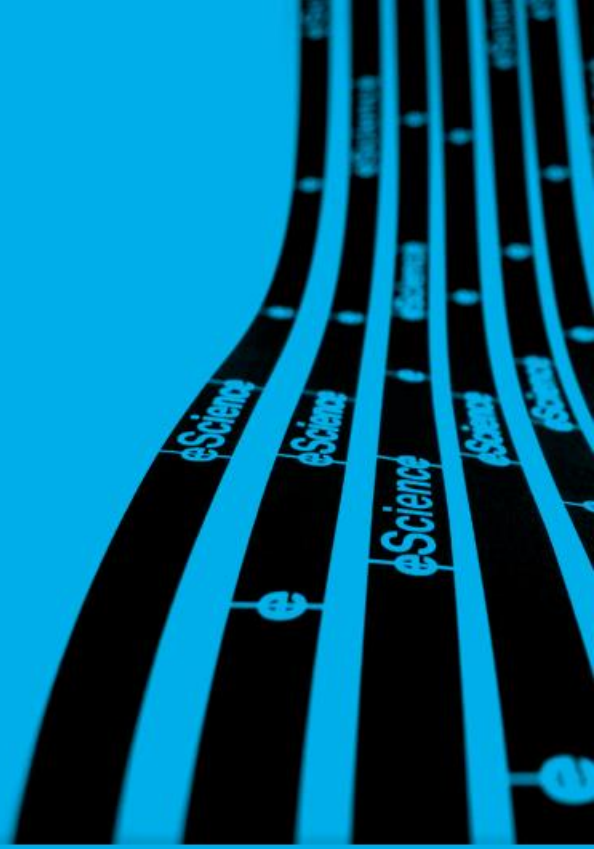

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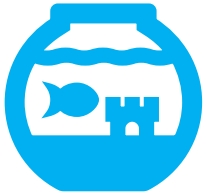
BLUE ACTION

Research Questions

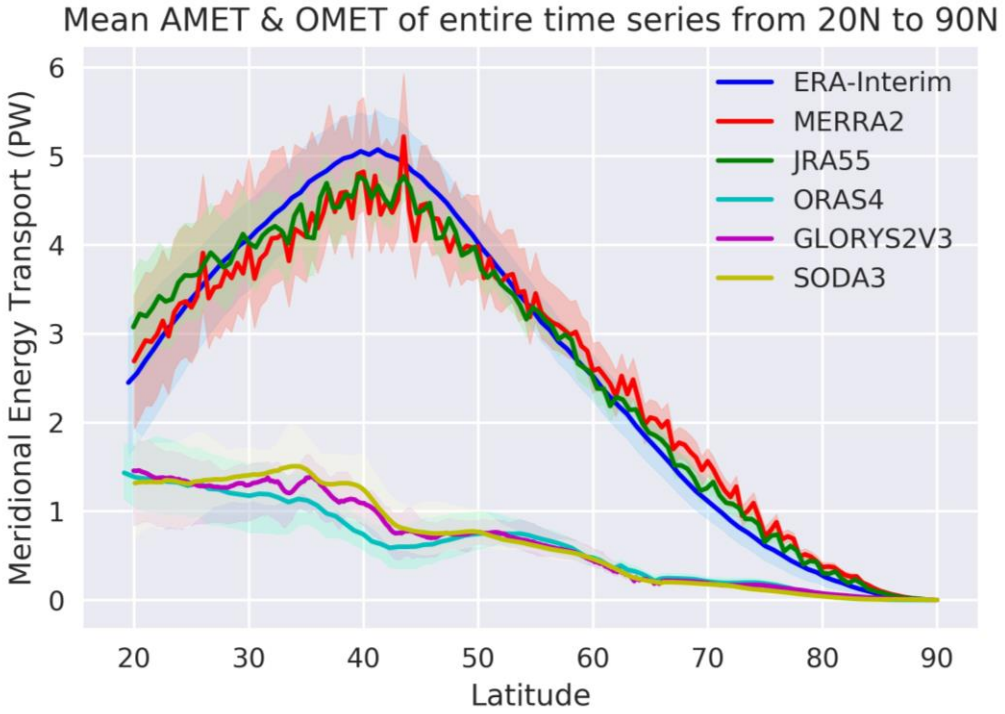
- **How does meridional energy transport in atmosphere and ocean towards the Arctic vary?**
- **What is the impact of variability in meridional energy transport on sea ice variations?**
- **How do the reanalysis products intercompare with aspect to the meridional energy transport?**

Reanalysis



• **ERA-Interim**	1979 - 2016	6 hourly	0.75° x 0.75° x 60 lev
• **MERRA2**	1980 - 2016	3 hourly	0.5° x 0.667° x 70 lev
• **JRA55**	1979 - 2015	6 hourly	0.5625° x 0.5625° x 60 lev
• **ORAS4**	1958 - 2014	monthly	ORCA1
• **GLORYS2V3**	1993 - 2014	monthly	ORCA025
• **SODA3**	1980 - 2015	5 daily	MOM5

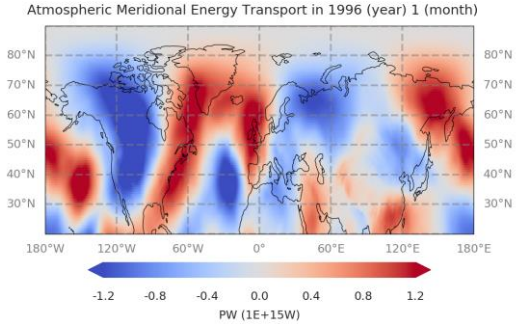
AMET & OMET



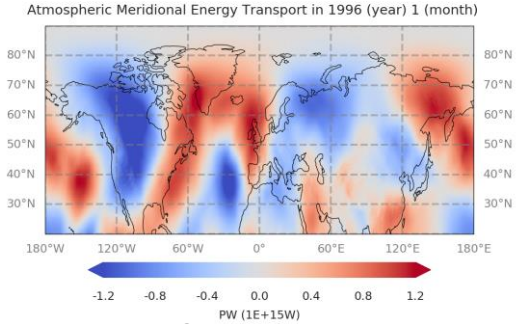
Mean AMET & OMET of entire time series from 20N to 90 N

Spatial Dist.

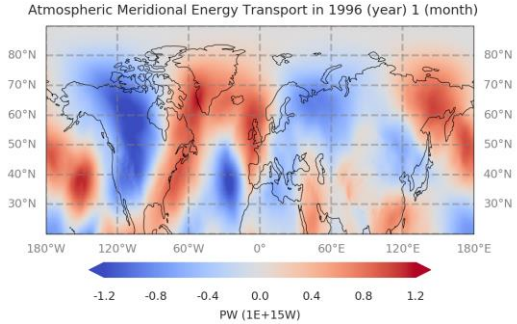
Transient AMET & OMET in January 1996 (monthly mean)



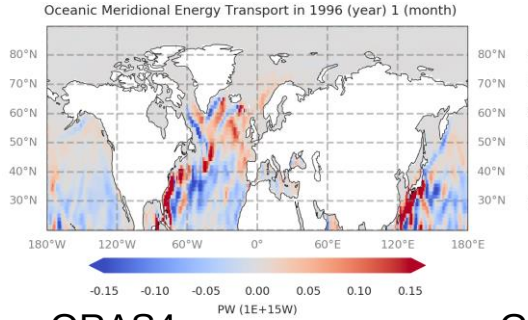
ERA-Interim



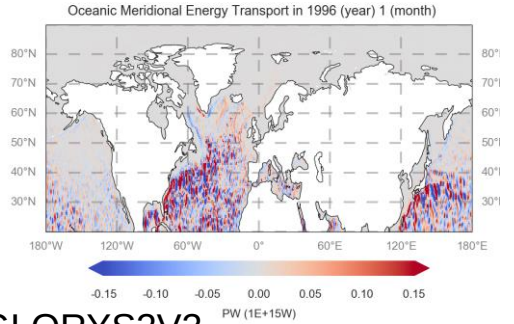
MERRA2



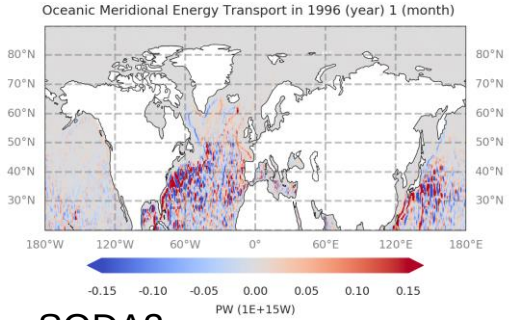
JRA55



ORAS4

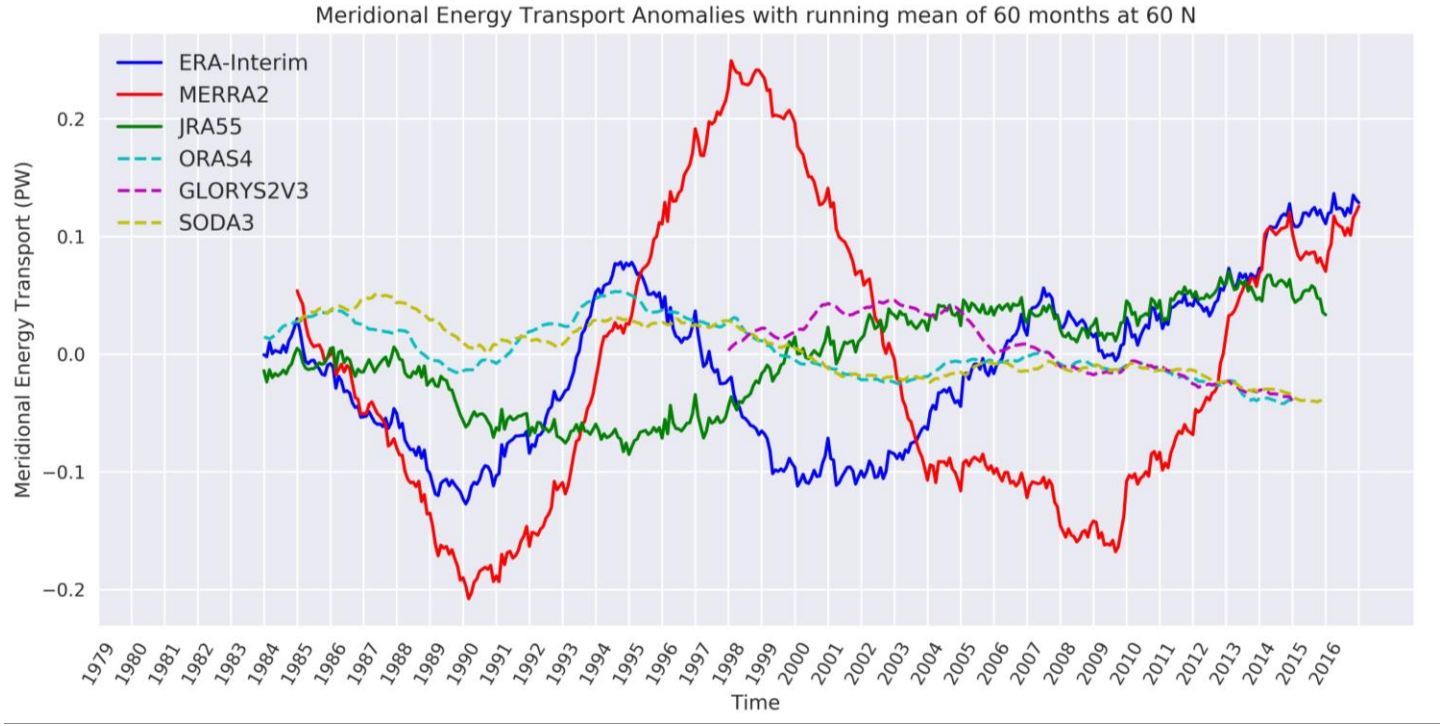


GLORYS2V3



SODA3

Low Frequency Signals



AMET & OMET anomalies with a running mean of 5 years

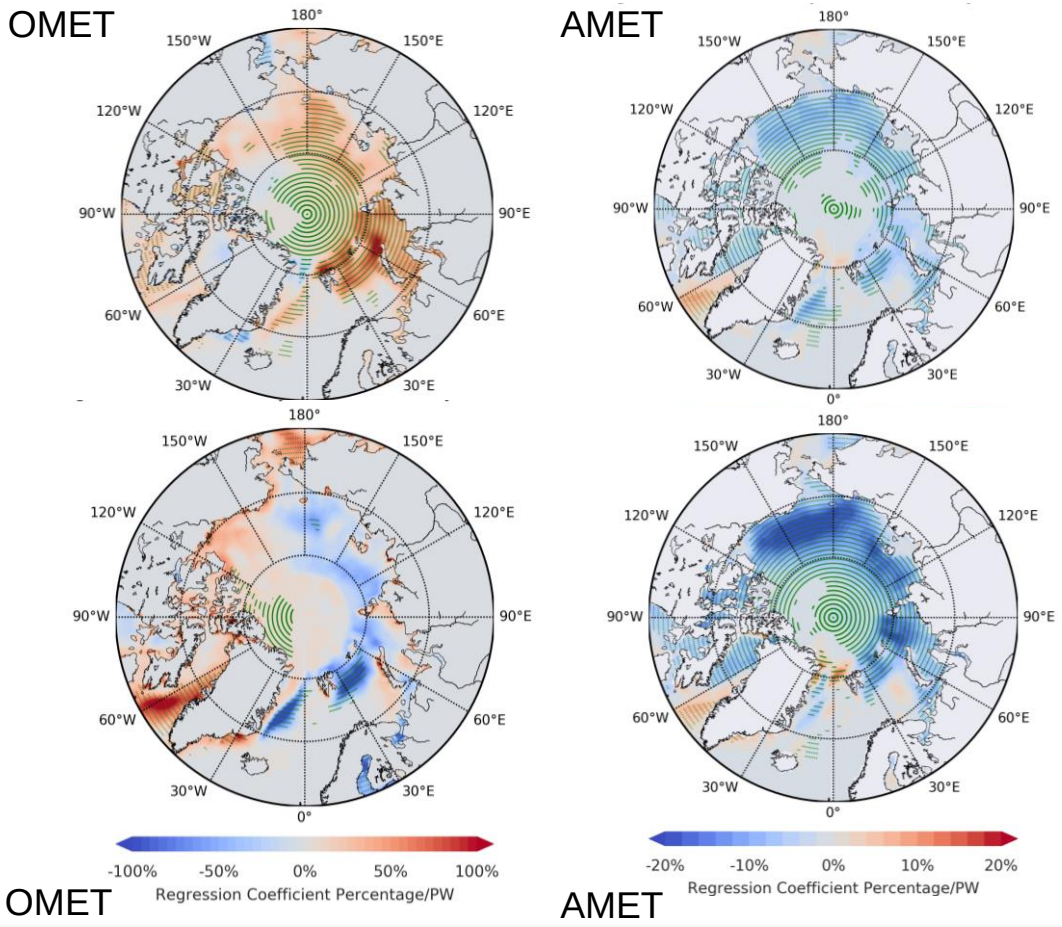
Sea Ice

Regression of Sea Ice Concentration anomalies on AMET (ERA-Interim) and OMET (GLORYS2V3)

The figure shows the fields from 60N to 90N

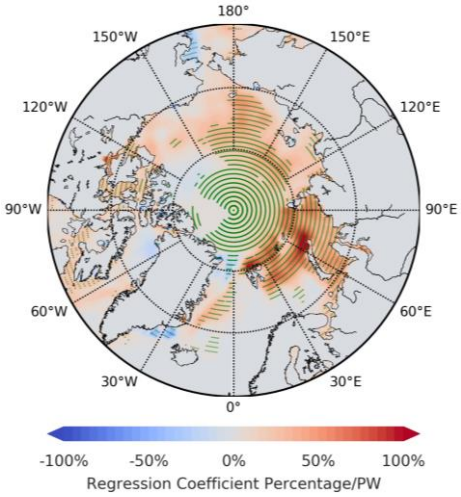
AMET/OMET at 60N

AMET/OMET at 70N



Sea Ice

Regression of Sea Ice Concentration (SIC) anomalies on OMET (GLORYS2V3)



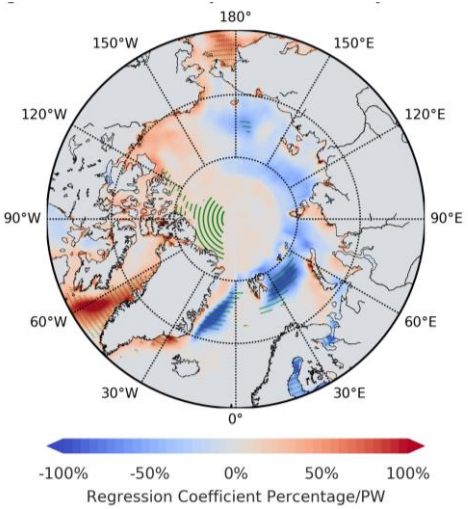
Regression of SIC on OMET at 60N

Heat loss between 60N and 70N

Variability of AMET and OMET

Sea Ice Variation

Compensation



Regression of SIC on OMET at 70N

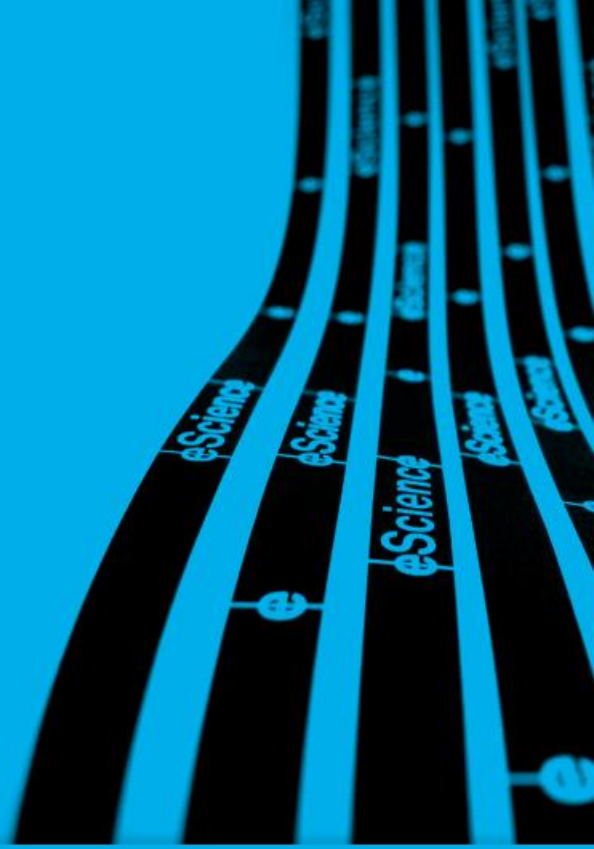
Conclusion

- AMET has strong correlation with sea ice variation. OMET from mid-latitudes influences sea ice through the interaction with atmosphere.

- The mean heat transports in all datasets agree well, while the spatial distribution and temporal variation deviate substantially. This consequently leads to the conclusion that the energy transports are not constraint in the reanalysis.

- Further investigation of the relation between ocean-atmosphere compensation, Arctic sea ice variation and change of meridional energy transports is in need.

Thank you



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