Seasonal changes of the ice-ocean-atmosphere-terrestrial system on the Yamal
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Main Points for Yamal: Strong increase in summer coastal open water, but weak land temperature and NDVI trends.

Positive fall increases in open water, land temperatures and NDVI.

Motivation and Methods
Goal: Investigate the role of seasonality in current understanding of tundra-climate relationships

Data: Use 25 km resolution SSMI passive microwave Bootstrap Sea Ice Concentration (SIC), AVHRR Surface Temperature (T_s), and new GIMMS NDVI_3g for the Arctic over the 1982-2010 period.

Methods:
• Trend and correlation analysis applied time series of Maximum NDVI, Time Integrated NDVI, Summer Warmth Index and Sea ice concentration.
• Full tundra domain over land and over ocean within 100-km of Arctic coastlines.

Map delineating study regions.

Seasonality of Trends & Variability
- Largest sea ice decreases are in spring and fall.
- Surface temperatures show fall warming and primarily cooling during spring and summer.
- MaxNDVI increases most near peak and in fall. In contrast, Beaufort region MaxNDVI increased most and the increases are largest during summer peak season.

Trends in Open Water, MaxNDVI & SWI
- SWI (a) shows very small from Barents to Laptev, consistent with TI-NDVI (b) increases over Barents and decreases in Laptev.
- E. Bering/W.Chukchi display MaxNDVI & TI-NDVI decline.
- In fall, display increases as well as decreases in SWI and MaxNDVI (partial trend plots).

Large Variability and Significant Correlations
- Sea ice concentration (15N coastal zone) displays significant decreases (blue).
- SWI shows a small decrease from 1982-2010 (red).
- NDVI (green) displays small positive trend but show a decline since 2007.

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References
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