

Impacts of free-tropospheric Processes on Arctic sea-ice melt-season transitions and transition trends

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Observations indicate that the length of the Arctic summer melt season is increasing, though the processes producing this increase are unknown. This study will present observations showing the importance of upper-level atmospheric processes and atmospheric synoptic events for determining a) surface energy budget changes, and b) dates of melt onset and end over Arctic sea ice. It will furthermore present analysis of observations showing that changes in melt transition dates over sea ice since 1954 support the lengthening of the summer melt season over Arctic sea ice, and that such changes are greater and statistically more significant for years when free-tropospheric atmospheric events coincide with melt transitions. This result suggests that observed long-term changes in the summer melt season over sea ice is, at least in-part, produced by changes in the seasonal advection of free-tropospheric air and synoptic systems from lower latitudes.