**Anomalous blocking over Greenland preceded the 2013 extreme early melt of local sea ice**

Supplementary Materials (Table S1 and Figs. S1-S5) are provided in support of manuscript listed above.

**Table S1.** GBIdescriptive statistics (mean=μ, standard deviation=σ) and sum (Σ) of days at different GBI value thresholds for the 40-day period preceding MO across the climatological normal period and the late melt years (1σ above the 1981-2010 mean). Significant differences, determined by a two-tailed t-test (p≤0.05), between GBI occurrences during the individual years and climatology are shown in bold (where threshold of occurrence is at least 5% of days, n=2).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time Period | GBI Descriptive  Statistics | | ΣGBI days (n) | | | | | |
|  | μ | σ | ≤-2 | ≤-1 | ≤0 | >0 | ≥1 | ≥2 |
| Climatology  (1981-2010) | 0.10 | 0.29 | 0.13 | 6.03 | 19.73 | 20.27 | 7.67 | 2.23 |
|  |  |  |  |  |  |  |  |  |
| 1984 | -0.31 | 1.09 | - | **14** | **29** | **11** | 6 | 2 |
| 1992 | -0.89 | 0.57 | - | **14** | **38** | **2** | 1 | - |
| 1982 | 0.75 | 1.15 | - | - | 15 | 25 | **17** | 7 |
| 1983 | 0.22 | 1.27 | - | 11 | 16 | 24 | 13 | 2 |
| 1980 | 0.14 | 0.66 | - | - | 18 | 22 | 6 | - |
| 1991 | 0.24 | 1.28 | - | 7 | 21 | 19 | 10 | 5 |

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**Fig. S1.** Time series of the significant lag correlations between normalized and detrended BDL melt onset (MO; black) and composite GBI values within daily periods preceding BDL MO (colors), 1979-2015 (following **Table 1**). All coefficients listed are significant at p≤0.05.



**Fig. S2.** Daily GBI values during the 40-days preceding the late BDL MO years (1σ above the 1981-2010 mean), which are listed sequentially in the top left of the plot with the corresponding day of year (DOY) marking continuous melt conditions for the region.



**Fig. S3**. North Atlantic composite SLP anomaly field from 3 March – 11 April 2013 relative to 1981-2010 mean for the 40-day period.



**Fig. S4**. March 2013 HadISST1 SST anomalies versus the 1981-2010 March mean.



**Fig. S5.** Time series of BDL freeze duration from 1980-2015. Freeze duration reflects the time period (i.e. days) from freeze onset observed during the previous autumn season to MO occurrence the following spring.