

Supplementary Materials

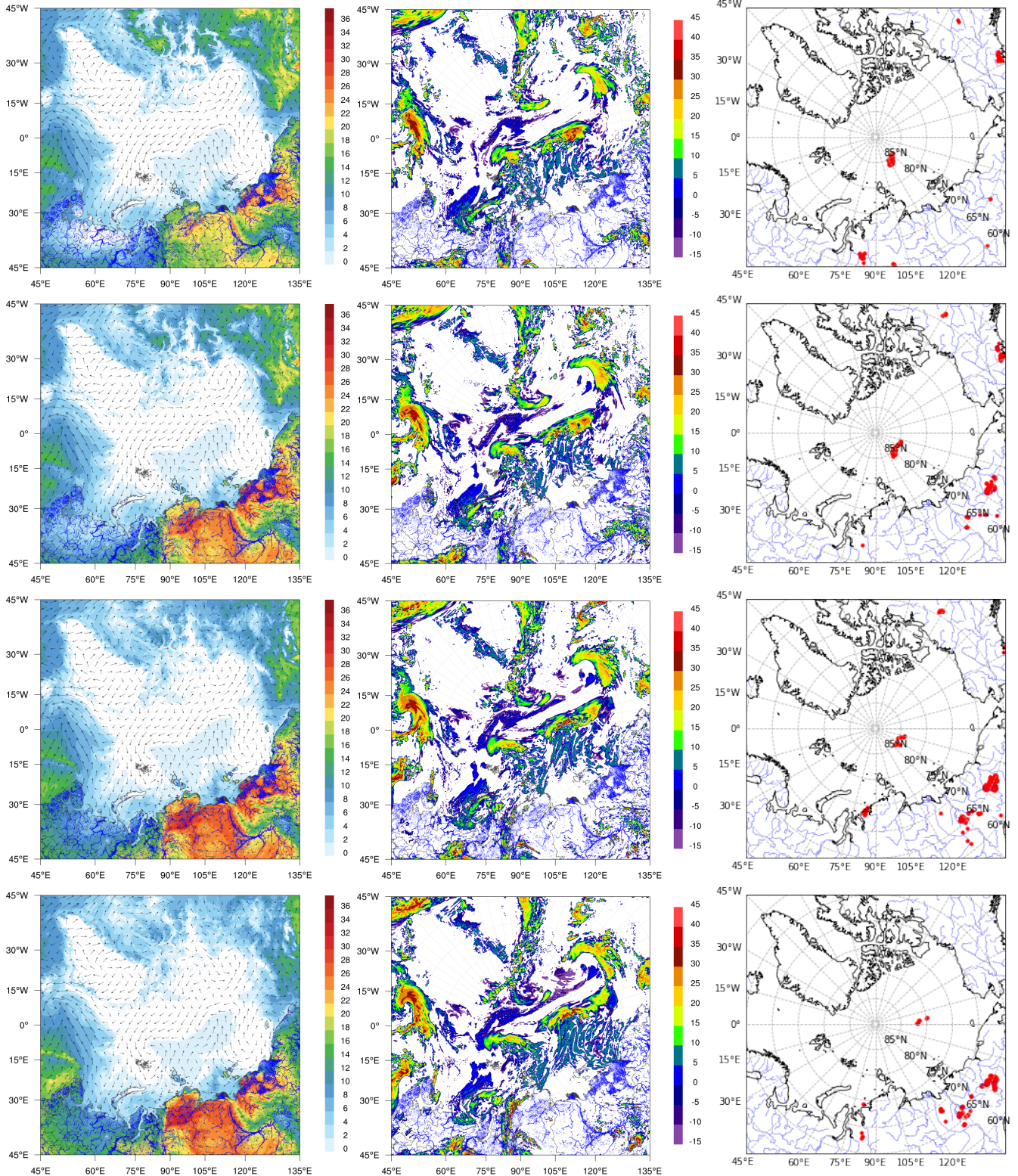
Thunderstorms Near the North Pole

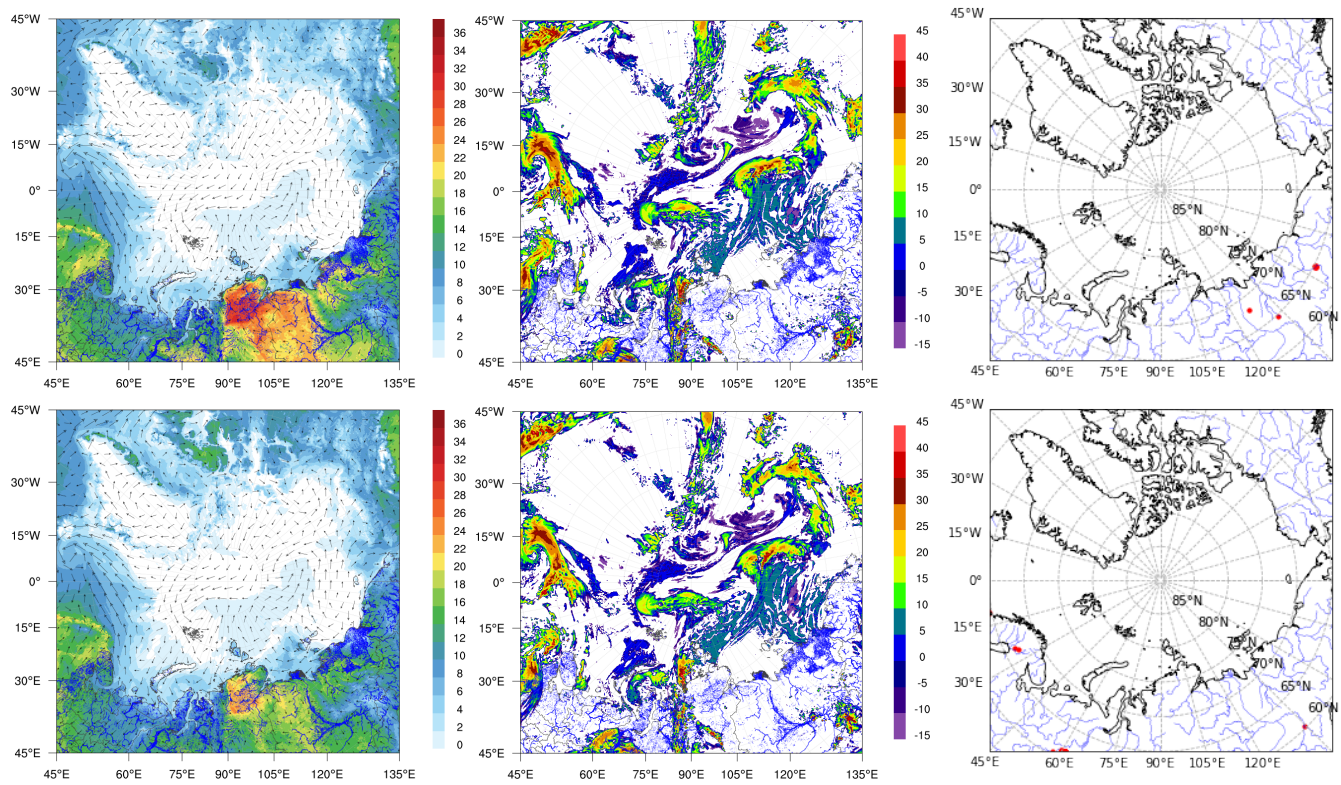
It turned out that the lightning activity statistics are determined by individual thunderstorms.

We simulated the state of the atmosphere during these storms with WRF-ARW.

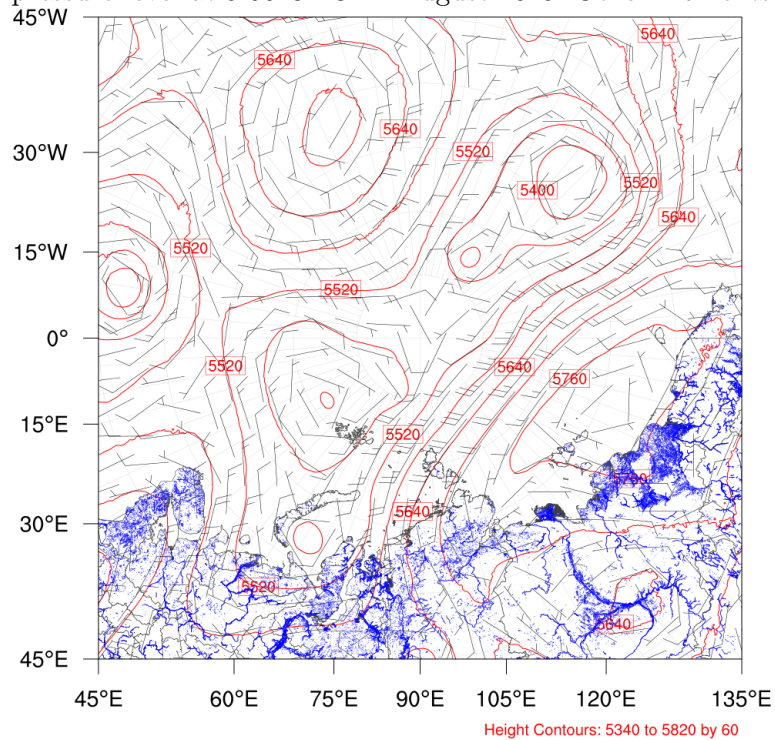
First figure in each section: 500 hPa geopotential height and horizontal wind. Left to right: temperature at 2 meters, maximum radar reflectivity, WLLN data from previous 2 and following 1 hours.

11 August 2019: 00:00, 03:00, 06:00, 09:00, 12:00, 15:00 UTC:



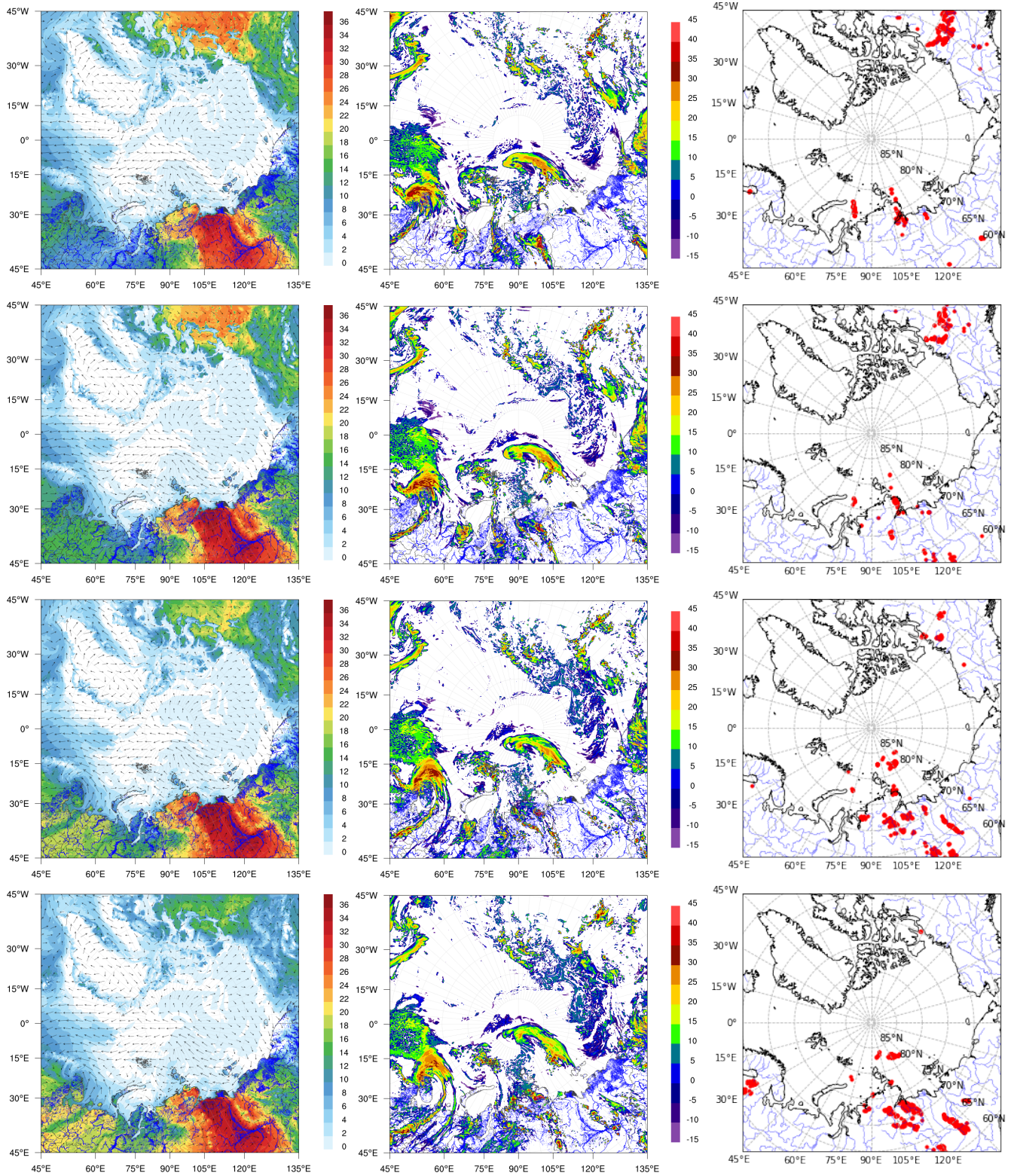


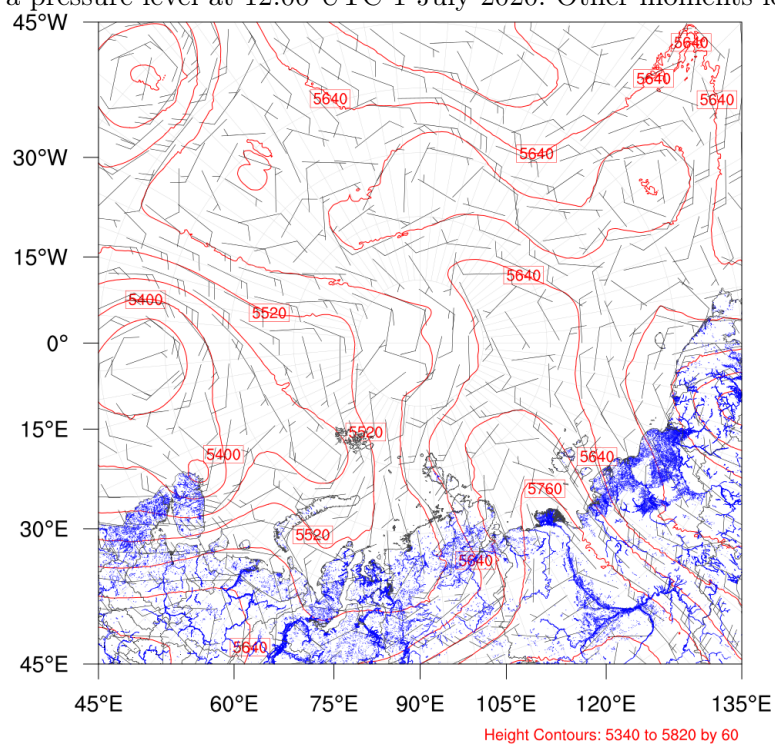
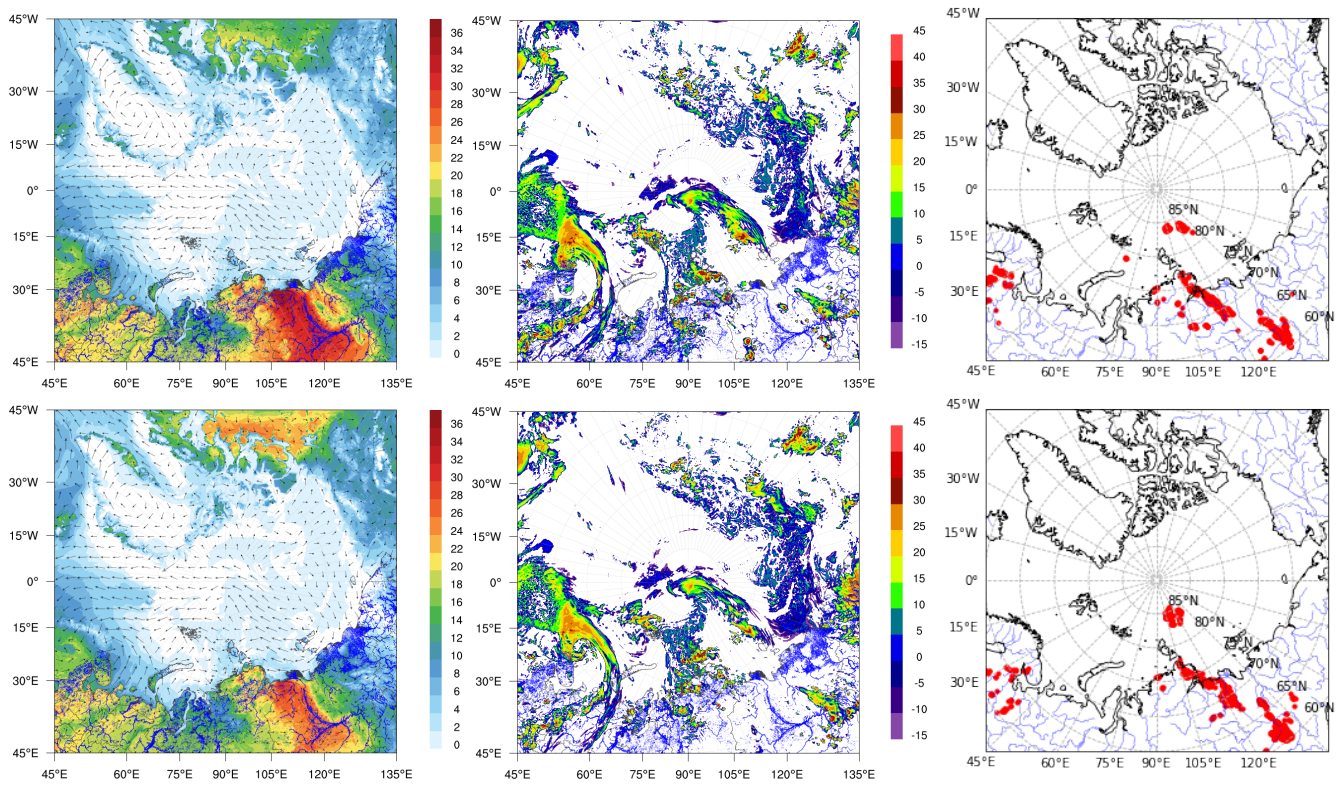
Height of 500 hPa pressure level at 9:00 UTC 11 August 2019. Other moments look quite similar.



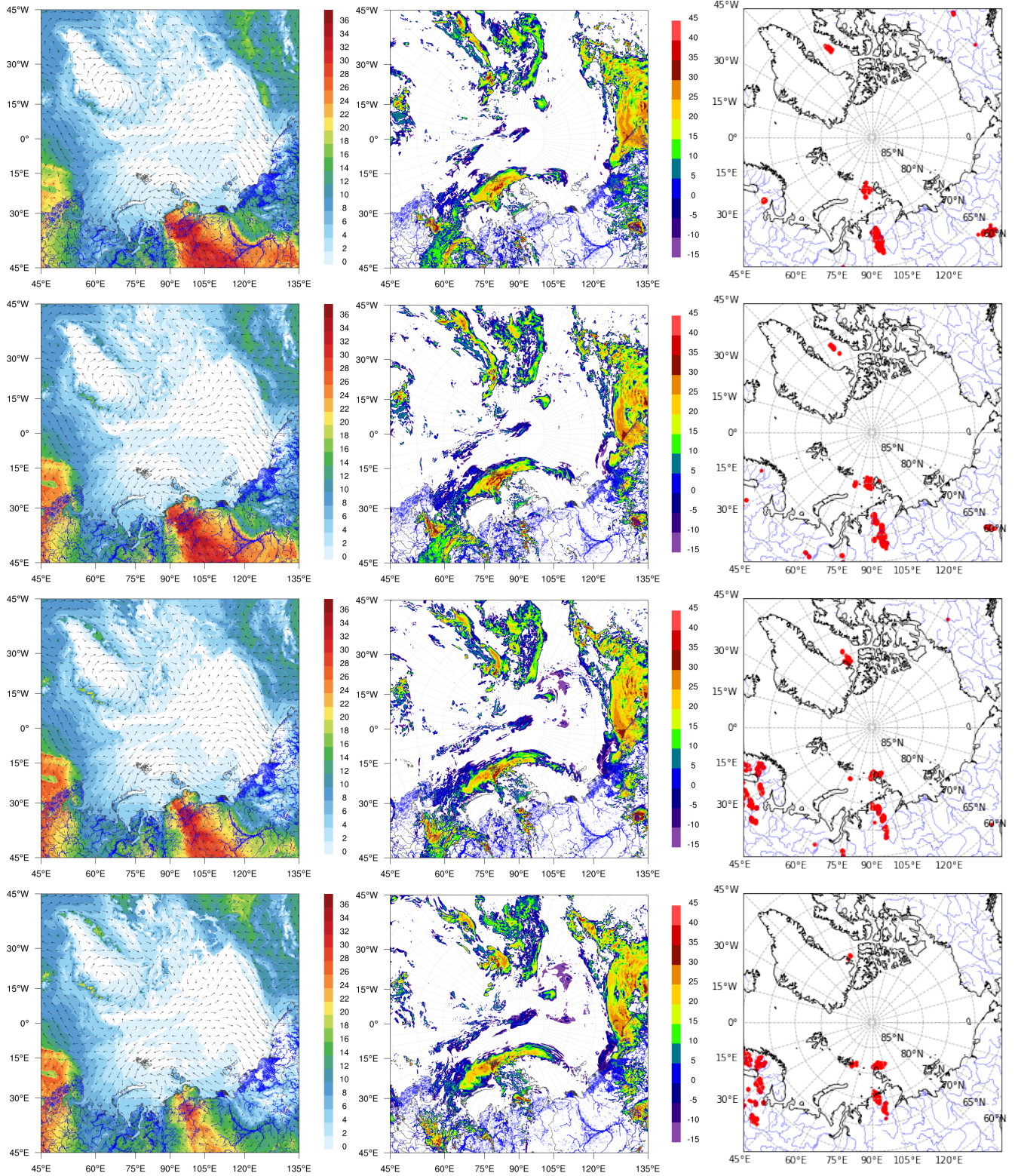
Height Contours: 5340 to 5820 by 60

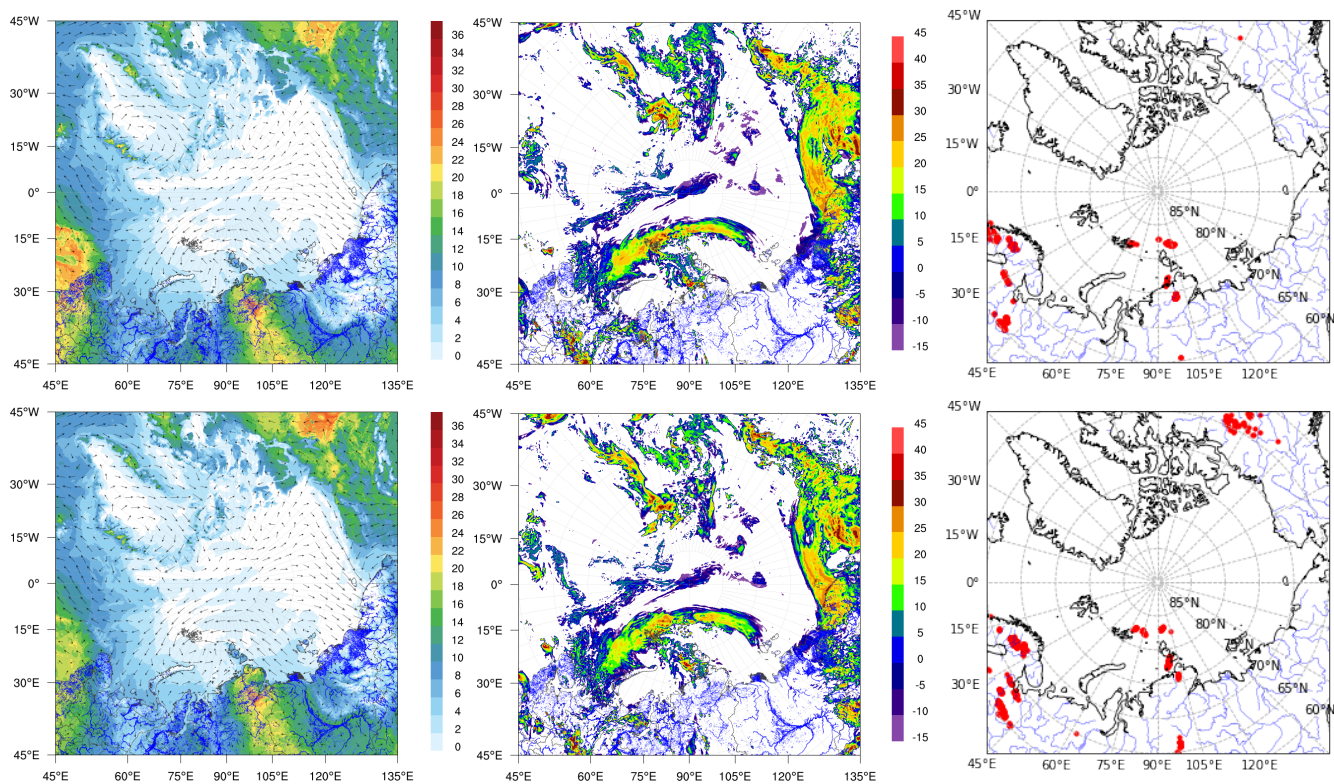
1 July 2020: 00:00, 03:00, 06:00, 09:00, 12:00, 15:00 UTC:



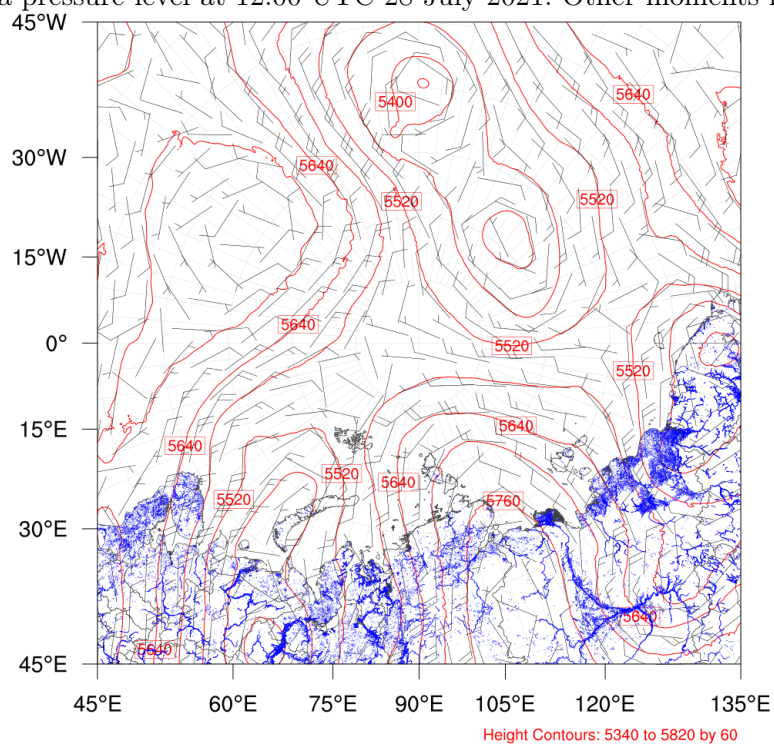


28 July 2021: 06:00, 09:00, 12:00, 15:00, 18:00, 21:00 UTC:

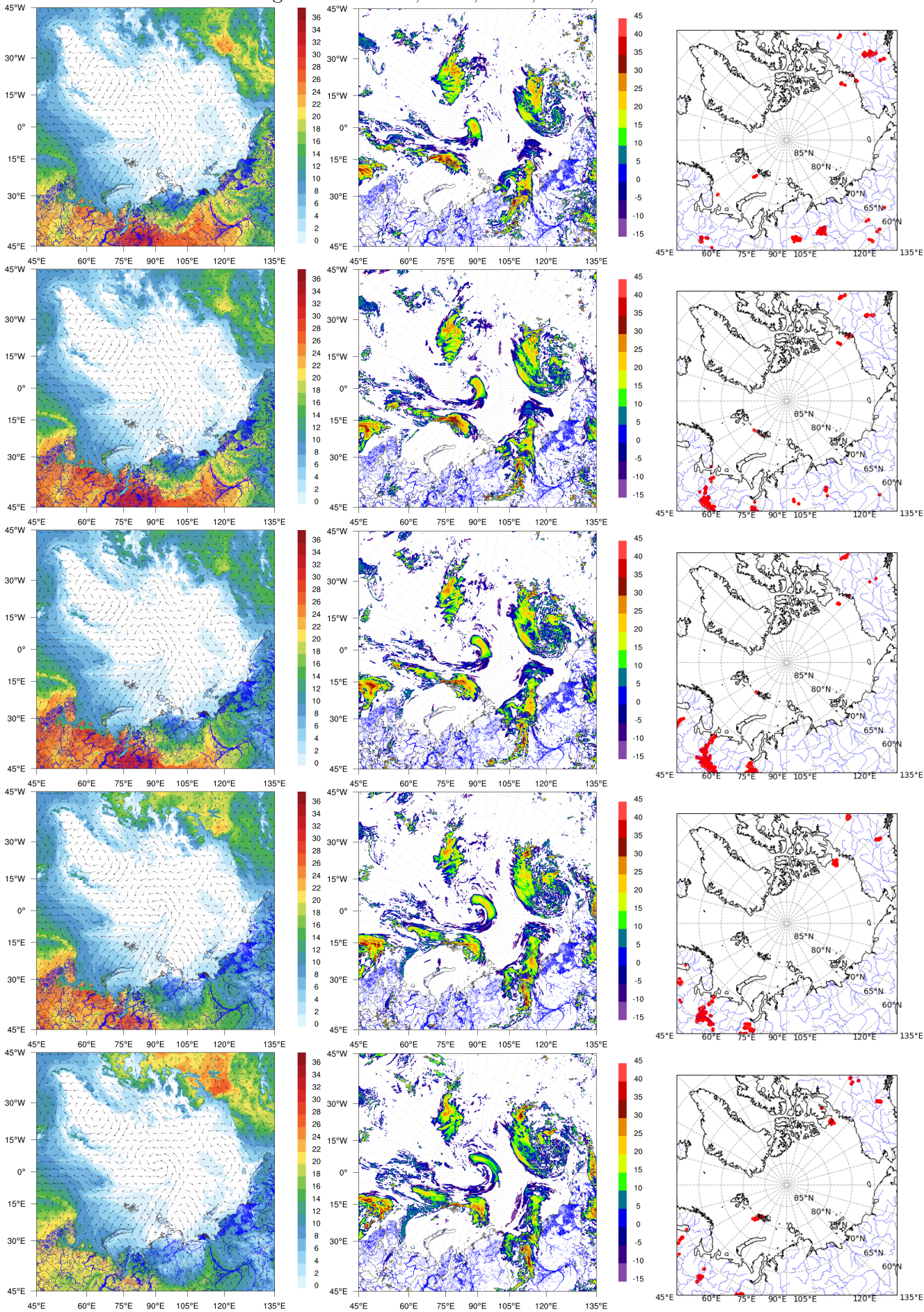




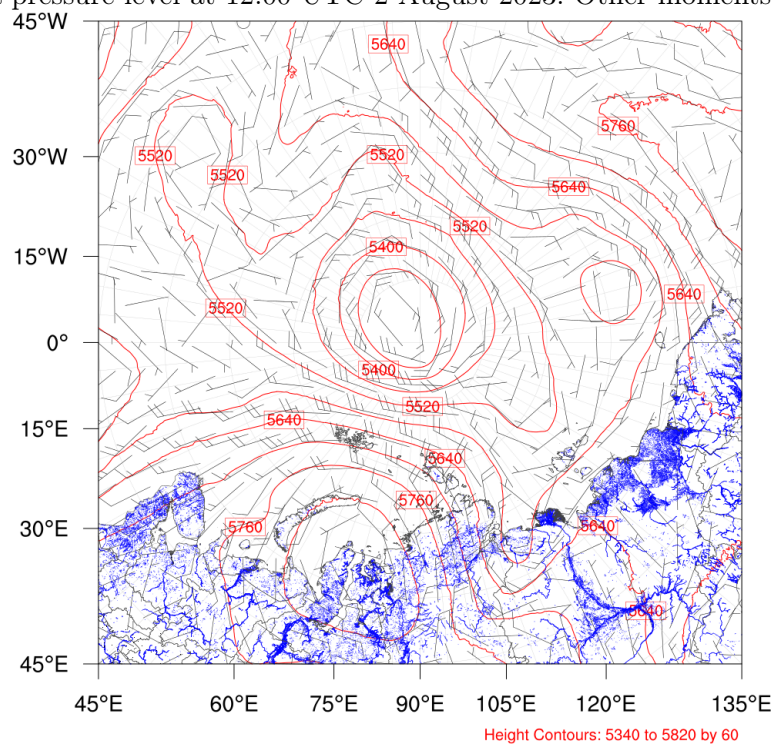
Height of 500 hPa pressure level at 12:00 UTC 28 July 2021. Other moments look quite similar.



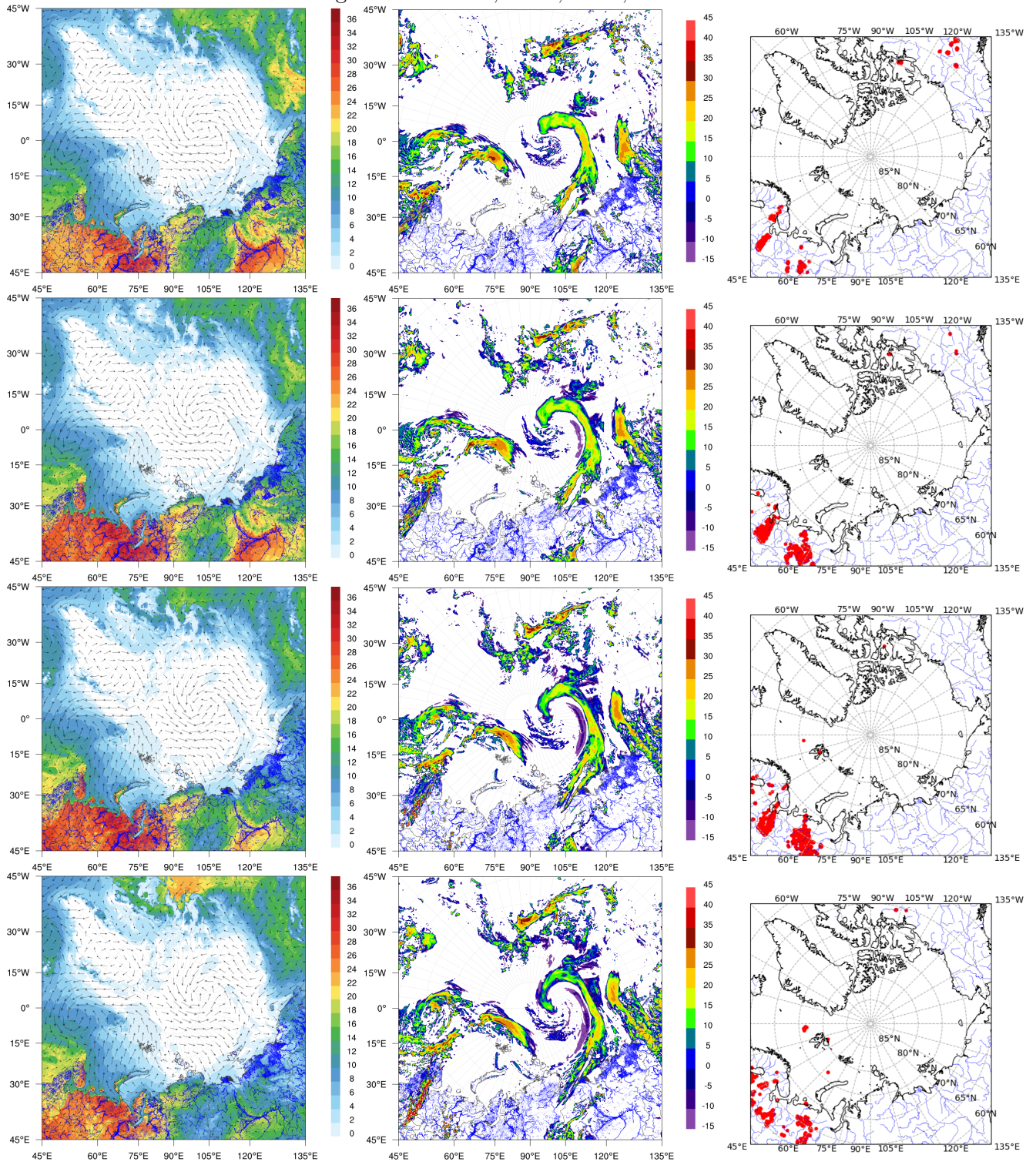
2 August 2023: 06:00, 09:00, 12:00, 15:00, 18:00 UTC:



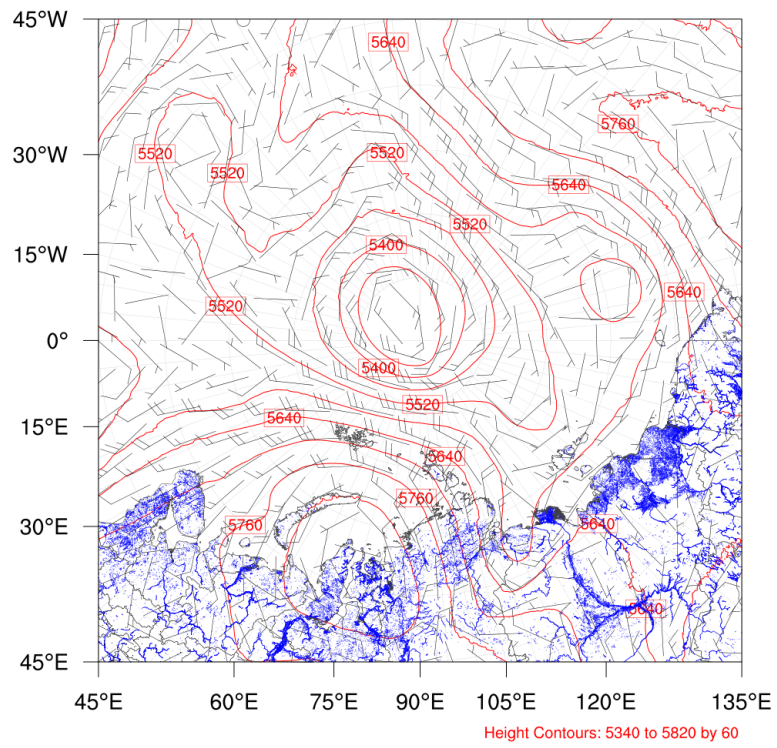
Height of 500 hPa pressure level at 12:00 UTC 2 August 2023. Other moments look quite similar.



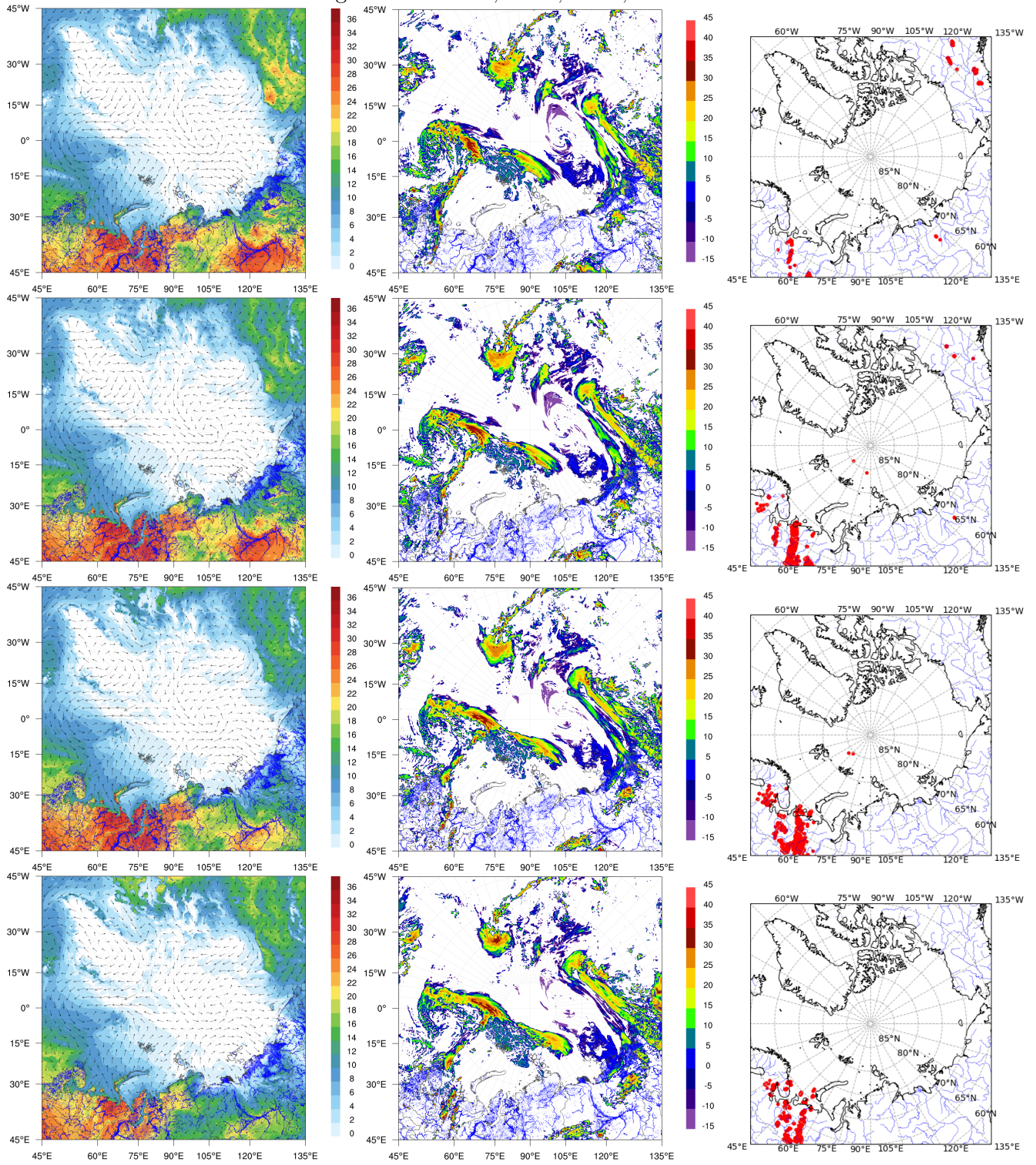
4 August 2023: 06:00, 09:00, 12:00, 15:00 UTC:



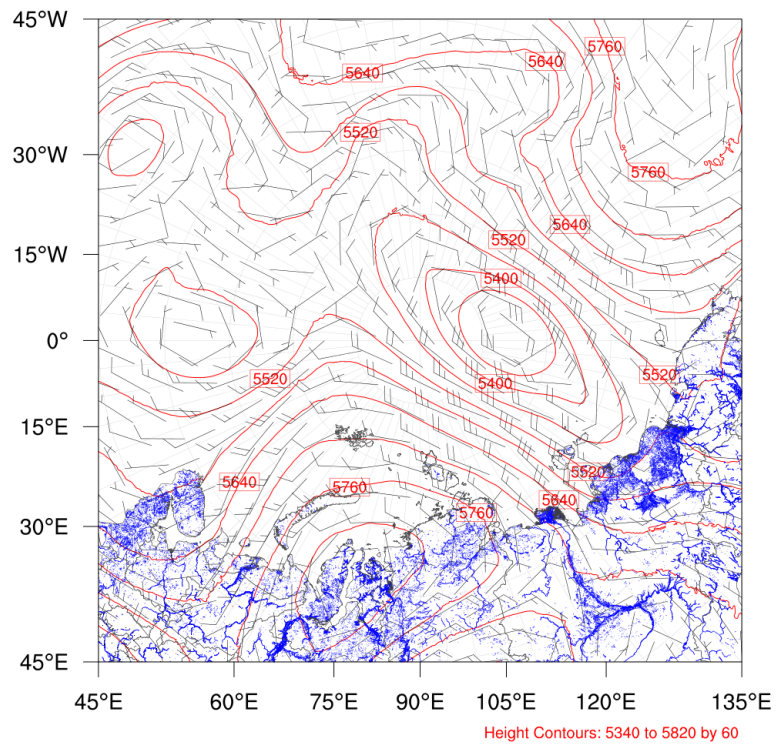
Height of 500 hPa pressure level at 12:00 UTC 4 August 2023. Other moments look quite similar.



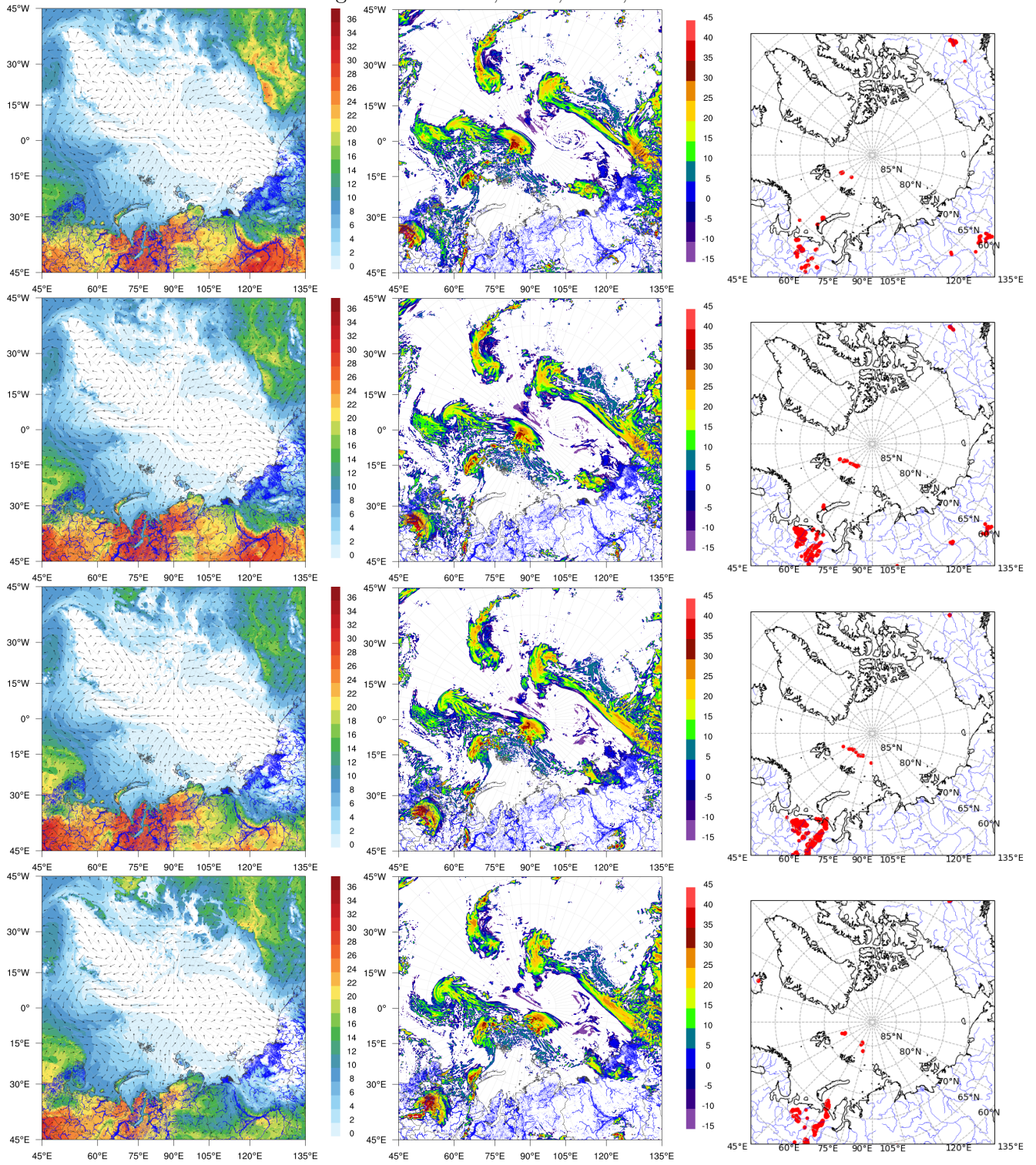
5 August 2023: 06:00, 09:00, 12:00, 15:00 UTC:



Height of 500 hPa pressure level at 12:00 UTC 5 August 2023. Other moments look quite similar.



6 August 2023: 06:00, 09:00, 12:00, 15:00 UTC:



Height of 500 hPa pressure level at 12:00 UTC 6 August 2023. Other moments look quite similar.

