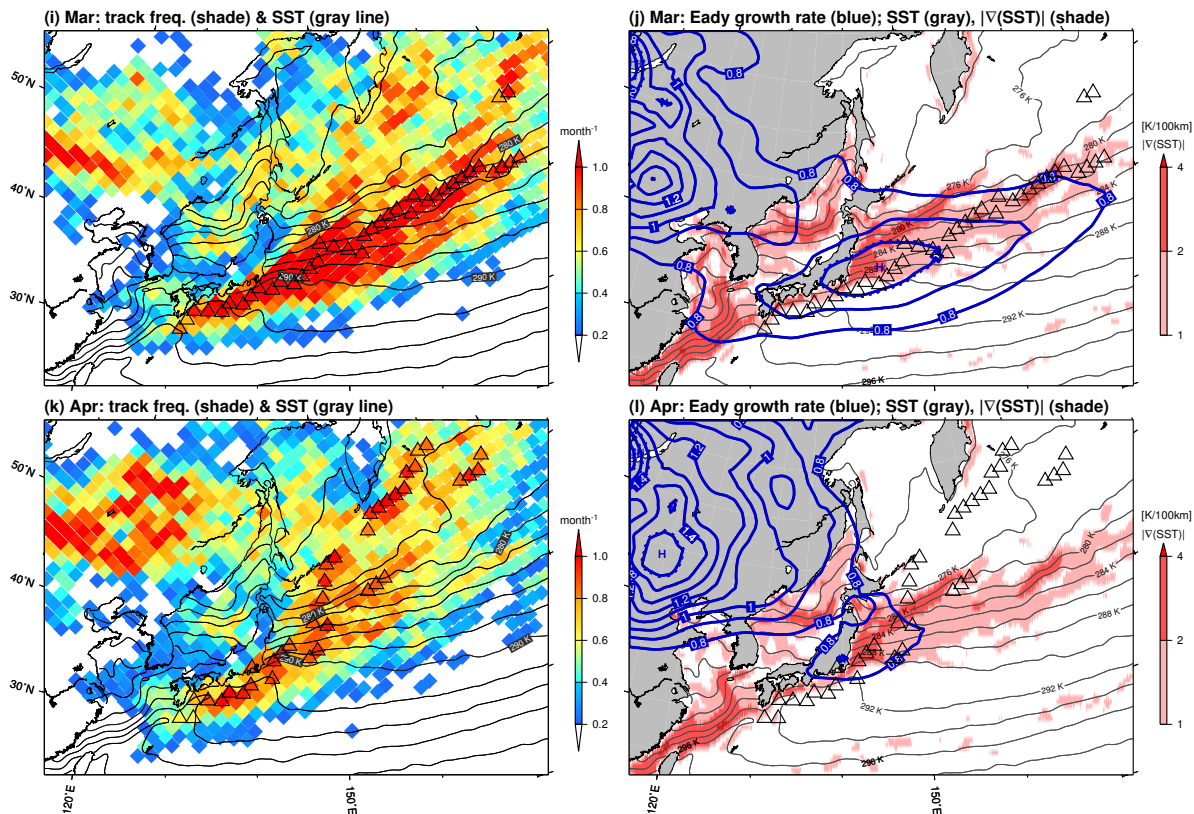


Supplement 1: Monthly climatology of cyclone track frequencies (shade in left column. unit: count/month) and horizontal sea surface temperature (SST) gradient (shade in right column. $|\nabla\text{SST}| \geq 1.0 \text{ K} (100 \text{ km})^{-1}$) for a cold half year (Nov–Apr) in 1982–2009. Thick blue lines in right column show the maximum Eady growth rate ($\sigma \equiv 0.31 f |\partial \mathbf{V} / \partial z| N^{-1}$; $\sigma \geq 0.8 \text{ day}^{-1}$. See Hoskins and Valdes, 1990). Triangles represent primary path of cyclones that is determined by the grid with the largest frequency inside the search area (surrounded by dashed line in (a)) along row direction of the EASE grid (approximately northwest-southeast direction around Japan). Thin solid lines show climatological SST (2 K interval).



Supplement 1: (Cont.)

Supplement 2: Monthly mean cyclone frequencies (unit: count/month) around Japan for a cold half year (Nov–Apr) in 1982–2009. The cyclones are selected from migrating cyclones across study area (30°– 50°N, 130°– 150°E). Short living cyclones (total lifetime < 24-hour) are omitted.

	Nov	Dec	Jan	Feb	Mar	Apr
all	10.3	10.3	10.9	11.2	14.4	12.8
bomb	4.3	5.6	5.7	5.7	6.2	2.8