**Appendix**

In order to explore the linkages between meteorological elements and SST, we collected monthly mean shortwave radiation and SST data for each season over the past 13 years (2004-2016) in the study site (1°×1°; Supplementary Figure S2).

Supplementary Fig. S1

Results of sensitive grain size analysis.

Supplementary Fig. S2

Distribution of seasonal SST and mean annual SST from 2004 to 2016. a) Spring SST; b) Summer SST; c) Autumn SST; d) Winter SST; e) Mean annual SST.

Supplementary Fig. S3

Comparison of the EAWM index (a): IEAT, Intensity of East Asian Trough; Iu500, Intensity of zonal wind shear at 500 h Pa; IEAJ, Intensity of East Asian Jet. Winter SST (b), Mean annual SST (c), and Short-wave radiation (d).

Supplementary Fig. S4

Continuous transform wavelet analyses for the TSI (a), SST (b), and coarser grain-size component (c) for core YS01. Spectral power (variance) is shown by colors ranging from deep blue (weak) to deep red (strong). Black cone lines delineate the upper boundary below which edge effects introduced by the computation method become important. Irregular black curves delineate the 95% confidence time-frequency regions in which the spectral strength is above red noise signal.