Supplemental material to:

"On the relationship between total ozone and atmospheric dynamics and chemistry at mid-latitudes – Part 2: The effects of the El Niño/Southern Oscillation, volcanic eruptions and contributions of atmospheric dynamics and chemistry to long-term total ozone changes"

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This document also contains augmented versions of Figs. 1–3, 5, 6 of the paper. In addition to the pointwise regression coefficient estimates and the p-values of the z-tests for significance of the estimates, which are all shown in the paper, the figures in this document also contain maps of the standard errors for the estimates at each grid cell. It is important to display individual standard errors for each grid cell, because the uncertainty of an estimate can be of interest independently of whether the estimate is significant or not. Moreover the standard errors are not constant across space (see panels (d)–(f) and (n)–(p) in Figs. S1–S3, S5, S6), for which reason indicating only a global "standard error" would not be sensible.

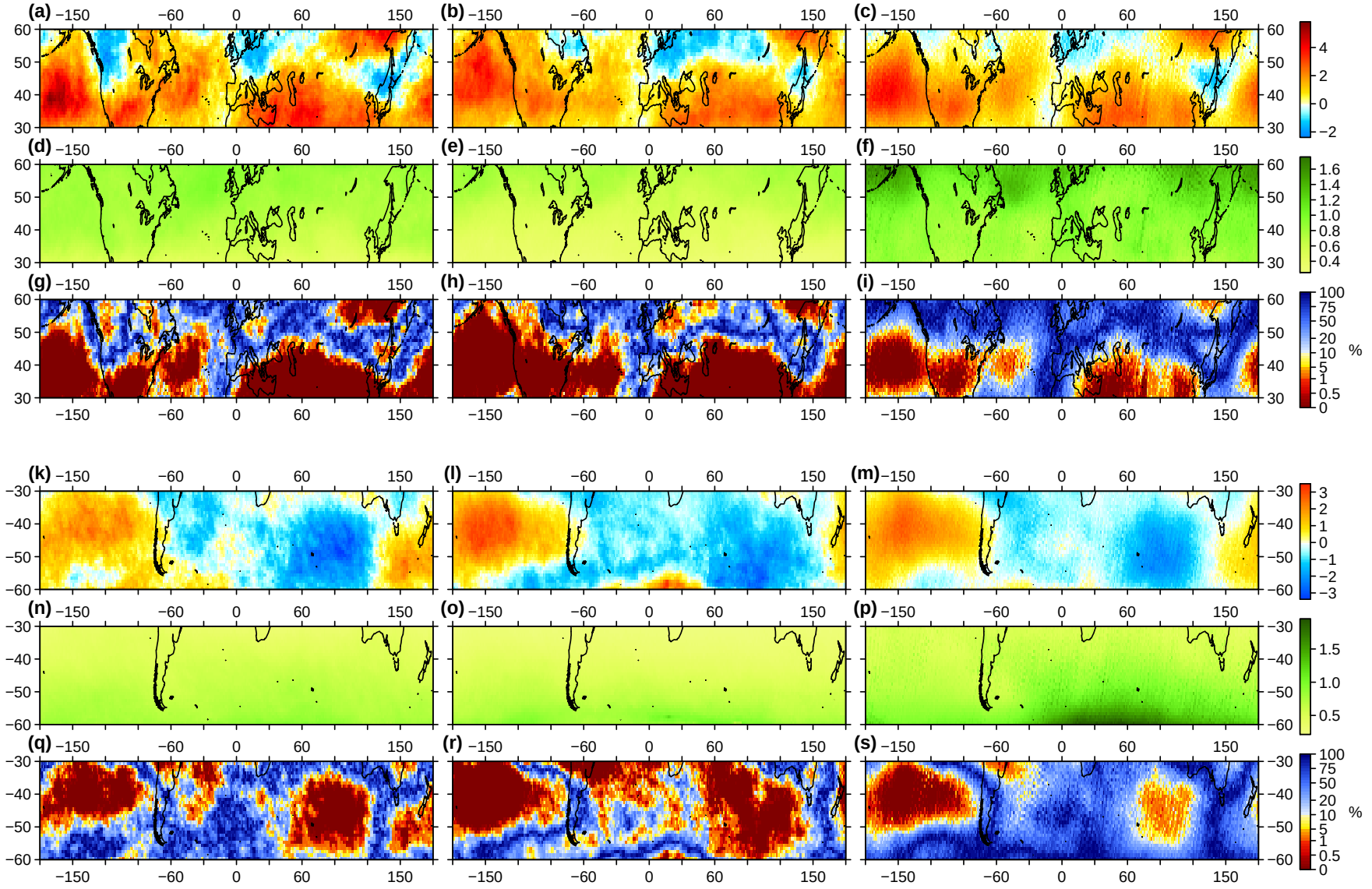

Fig. S1. Pointwise regression coefficient estimates (in DU (unit ENSO)$^{-1}$) for the El Niño/Southern Oscillation on an annual basis for **(a)** EHOs, **(b)** ELOs, and **(c)** mean values of total ozone at 30° N to 60° N; **(d)**–**(f)** show standard errors for the estimates in **(a)**–**(c)**, while **(g)**–**(i)** show the corresponding p-values of pointwise significance tests. **(k)**–**(s)** as **(a)**–**(i)** but at 30° S to 60° S.

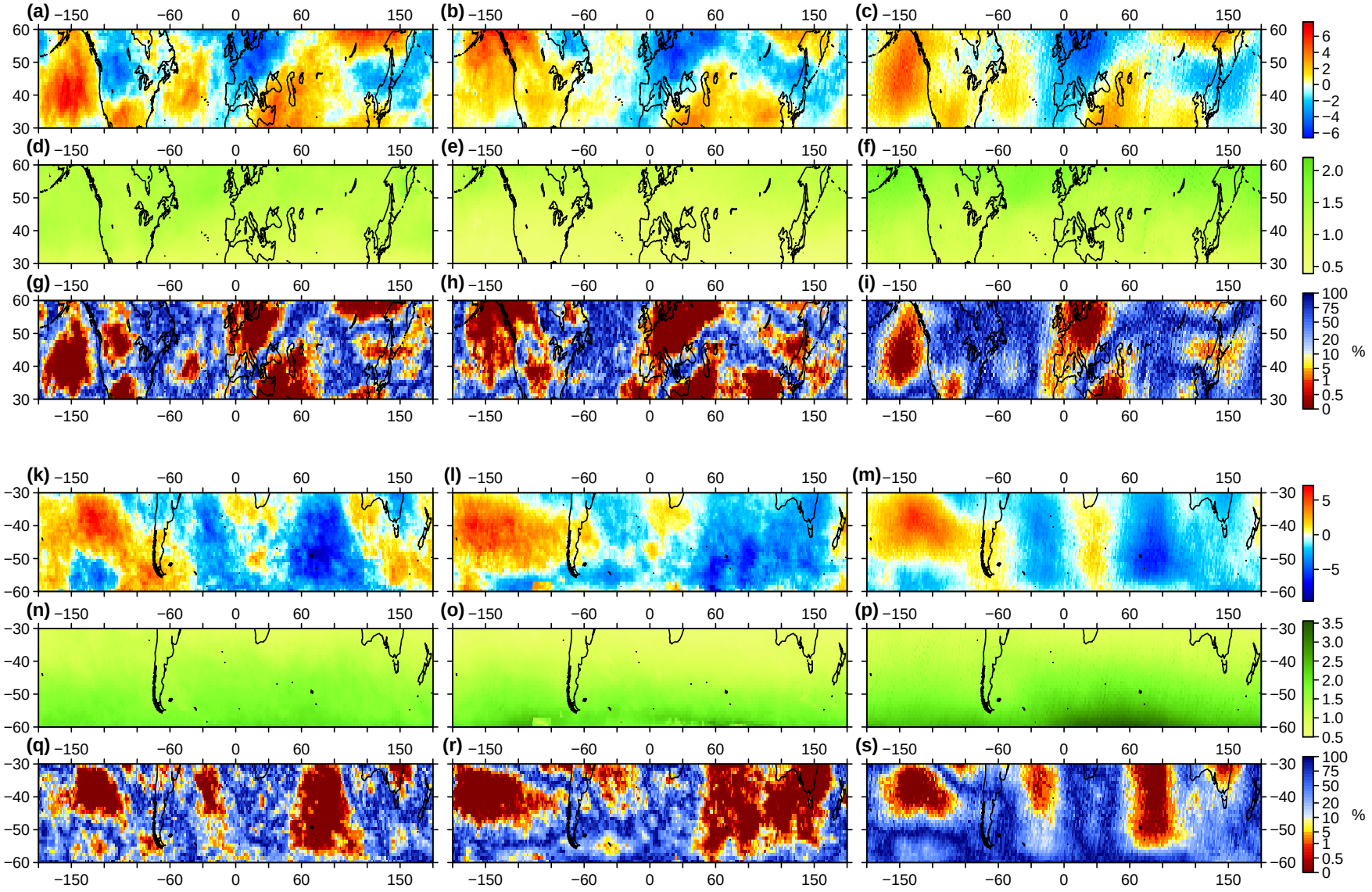

Fig. S2. Pointwise regression coefficient estimates (in DU (unit ENSO)$^{-1}$) for the El Niño/Southern Oscillation on an annual basis for **(a)** EHOs, **(b)** ELOs, and **(c)** mean values of total ozone during winter (DJF) at 30° N to 60° N; **(d)**–**(f)** show standard errors for the estimates in **(a)**–**(c)**, while **(g)**–**(i)** show the corresponding p-values of pointwise significance tests. **(k)**–**(s)** as **(a)**–**(i)** but during winter (JJA) at 30° S to 60° S.

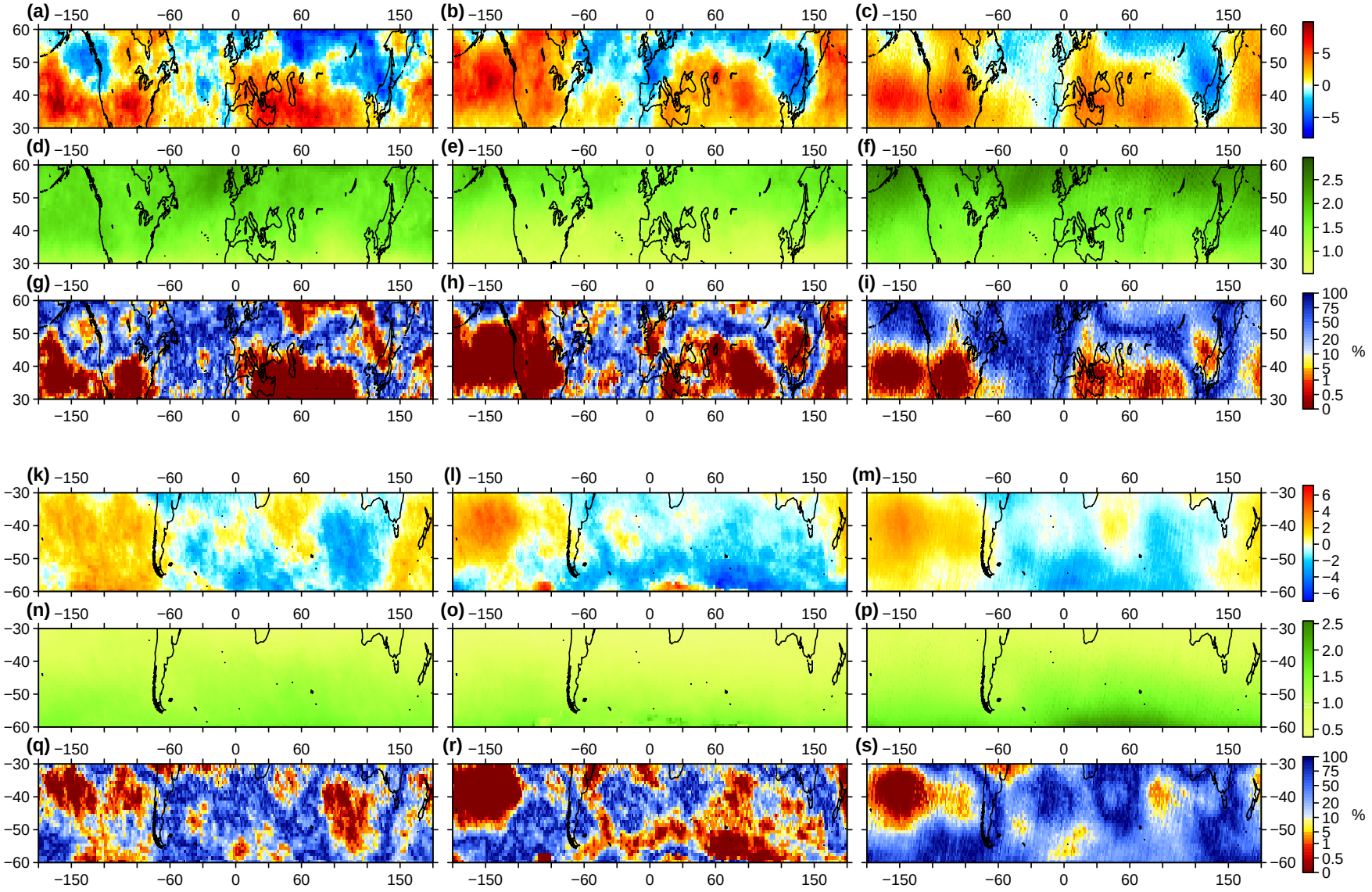

Fig. S3. Pointwise regression coefficient estimates (in DU (unit ENSO)$^{-1}$) for the El Niño/Southern Oscillation on an annual basis for **(a)** EHOs, **(b)** ELOs, and **(c)** mean values of total ozone during spring (MAM) at 30° N to 60° N; **(d)**–**(f)** show standard errors for the estimates in **(a)**–**(c)**, while **(g)**–**(i)** show the corresponding p-values of pointwise significance tests. **(k)**–**(s)** as **(a)**–**(i)** but during spring (SON) at 30° S to 60° S.

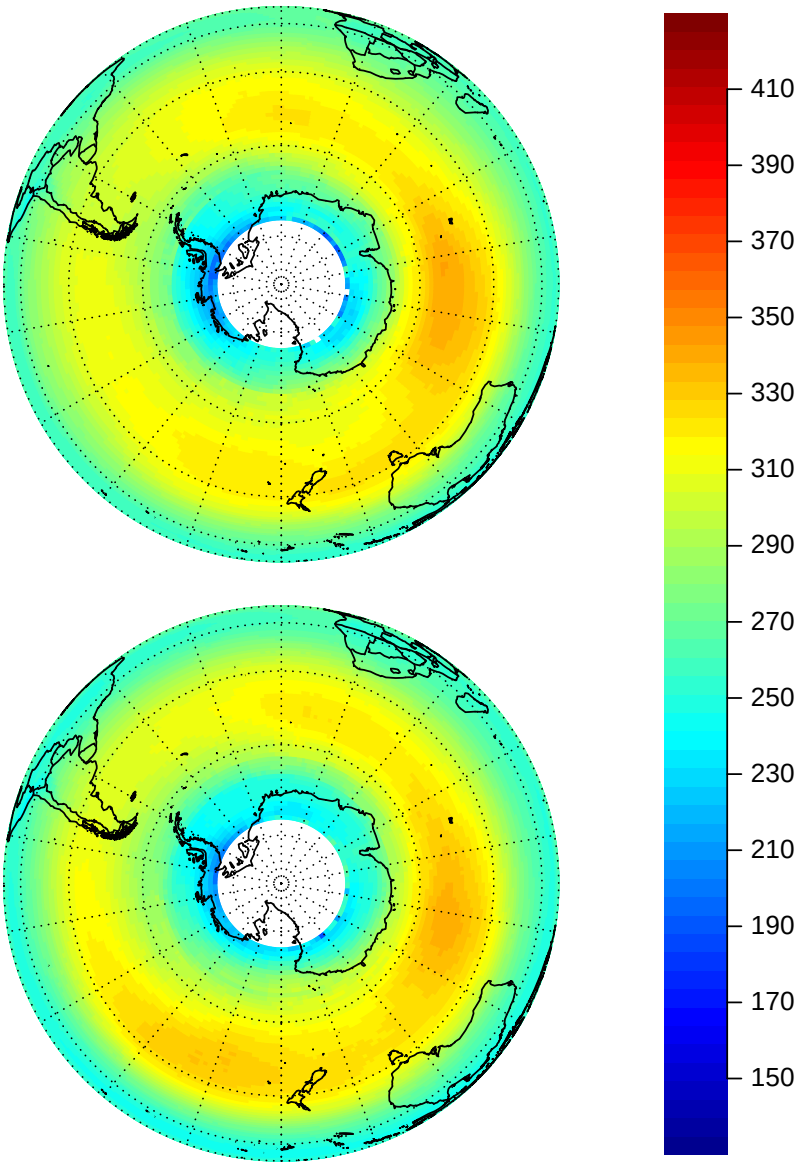

Fig. S4. Southern hemisphere seasonal mean column ozone (in DU) during austral winter (JJA) for all strong La Niña years (top) and El Niño years (bottom) in 1979–2007.

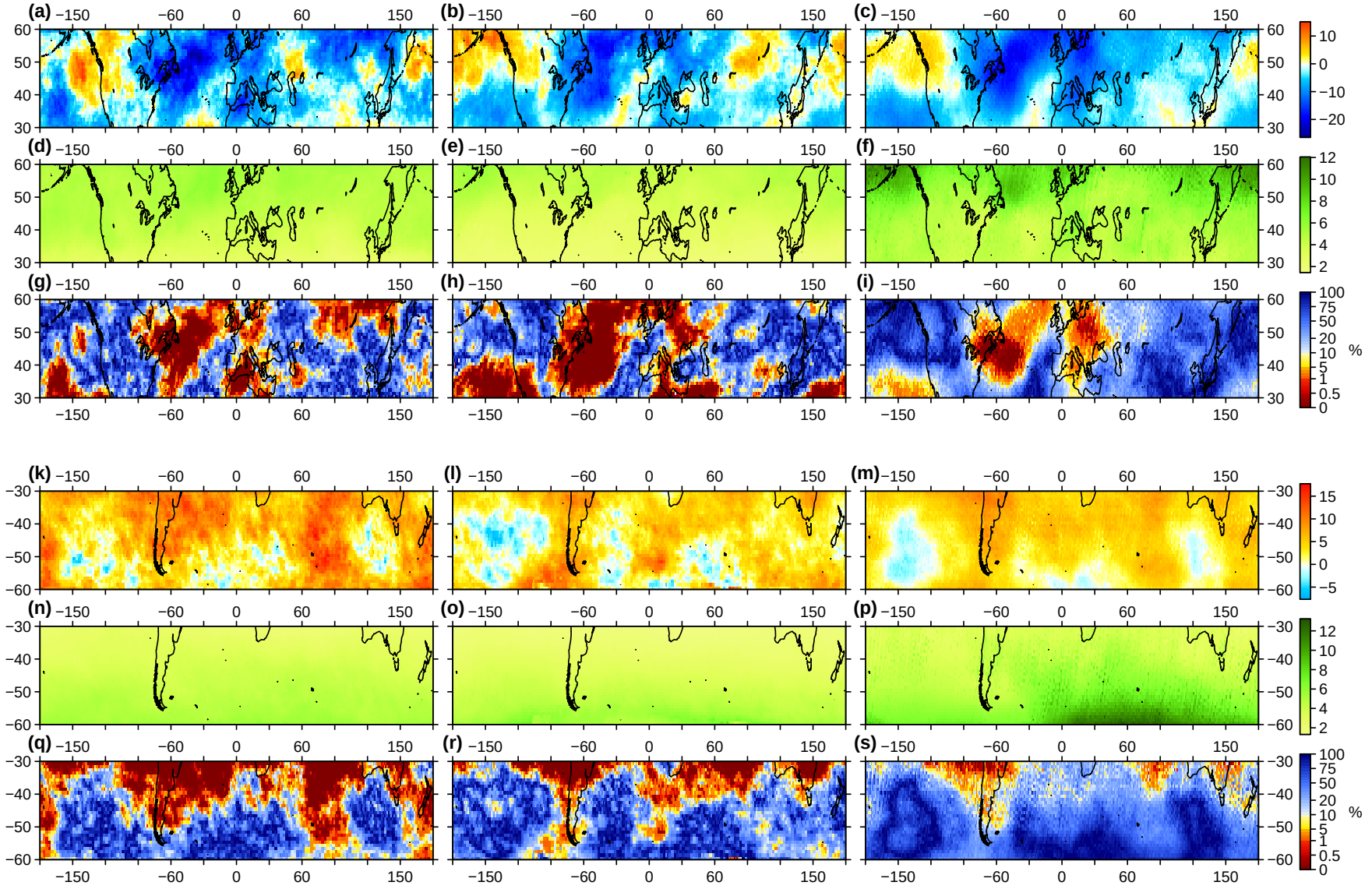

Fig. S5. Pointwise regression coefficient estimates (in DU (unit Sato Index)$^{-1}$) for the volcanic eruption of El Chichón on an annual basis for **(a)** EHOs, **(b)** ELOs, and **(c)** mean values of total ozone at 30° N to 60° N; **(d)**–**(f)** show standard errors for the estimates in **(a)**–**(c)**, while **(g)**–**(i)** show the corresponding p-values of pointwise significance tests. **(k)**–**(s)** as **(a)**–**(i)** but at 30° S to 60° S.

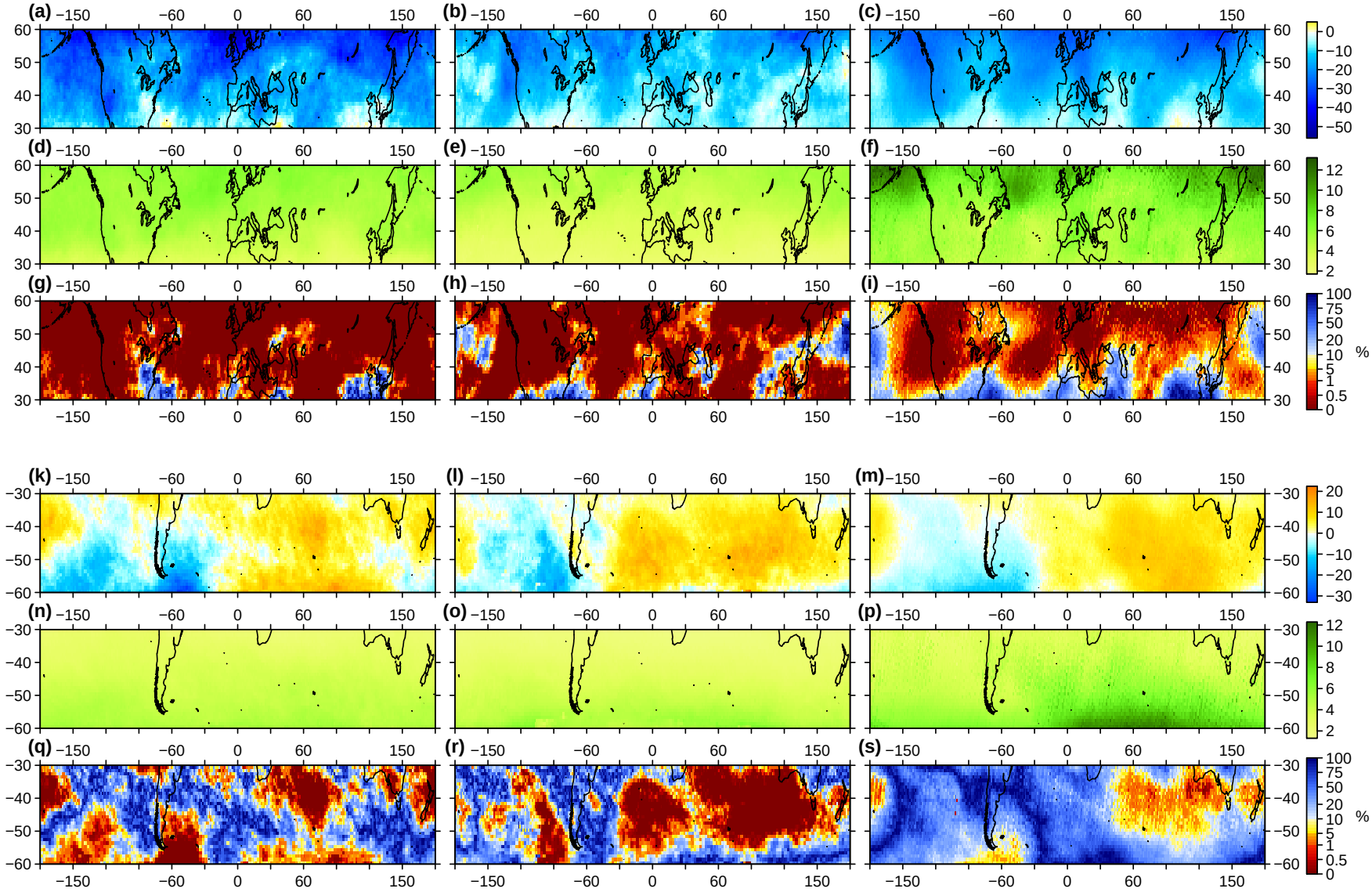

Fig. S6. Pointwise regression coefficient estimates (in DU (unit Sato Index)$^{-1}$) for the volcanic eruption of Mt. Pinatubo on an annual basis for **(a)** EHOs, **(b)** ELOs, and **(c)** mean values of total ozone at 30° N to 60° N; **(d)**–**(f)** show standard errors for the estimates in **(a)**–**(c)**, while **(g)**–**(i)** show the corresponding p-values of pointwise significance tests. **(k)**–**(s)** as **(a)**–**(i)** but at 30° S to 60° S.

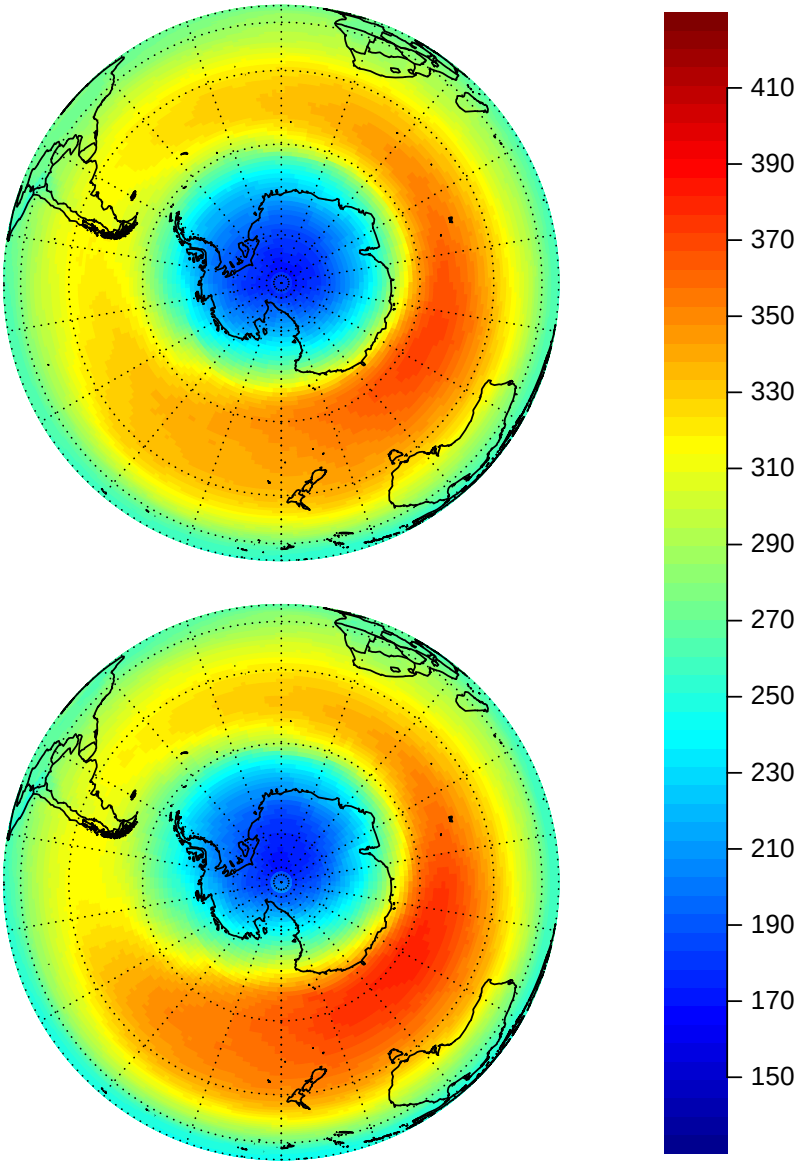

Fig. S7. Southern Hemisphere seasonal mean column ozone (in DU) during austral spring (SON) in 1989–1992. Top: 1989–90 for pre-Pinatubo eruption period. Bottom: 1991–92 for the eruption period.