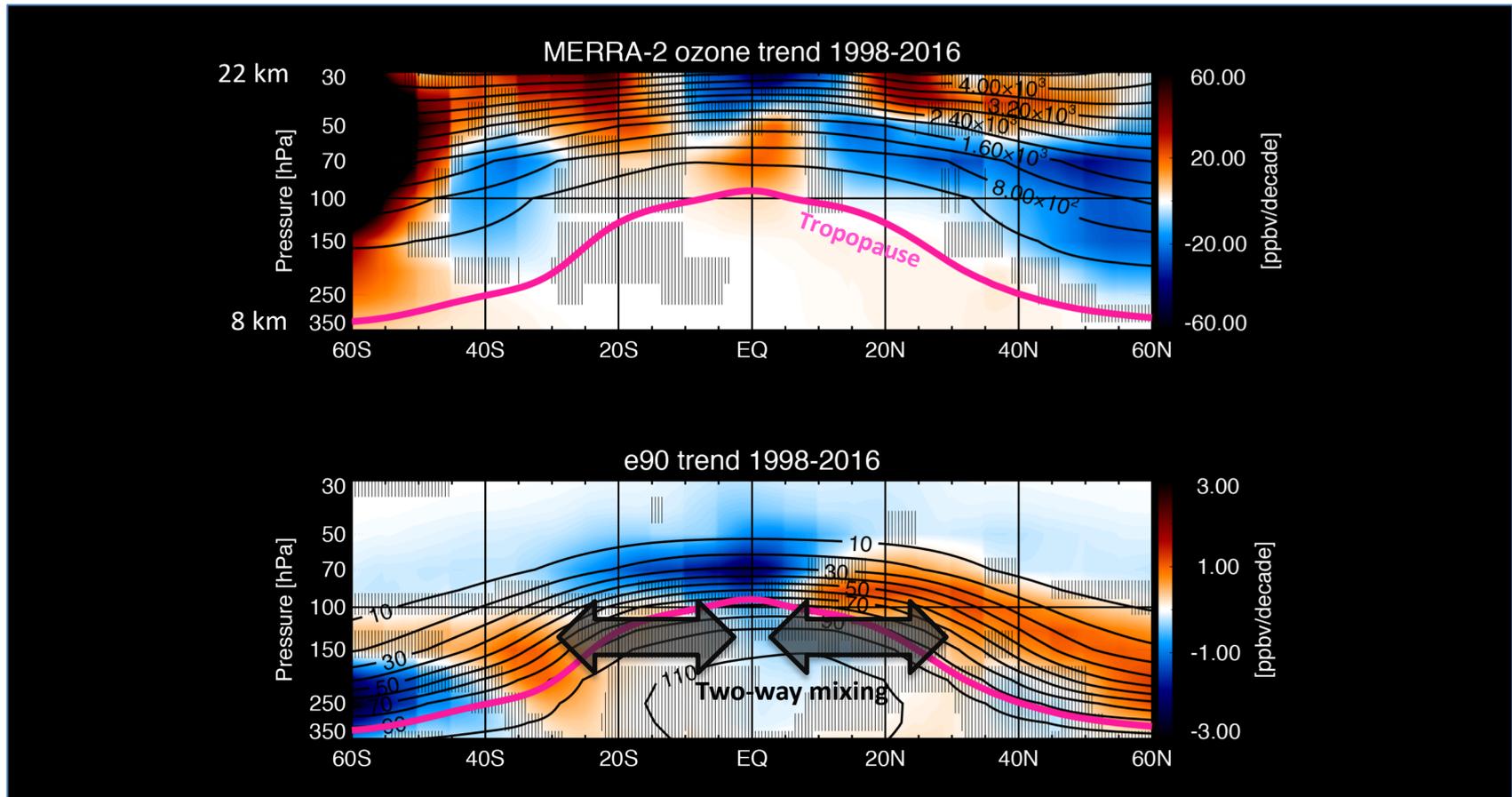




Trends in Lower Stratospheric Ozone and an Idealized Tracer in MERRA-2



Atmospheric ozone concentrations are expected to increase after 1998 because of the Montreal Protocol. In MERRA-2, ozone just above the tropopause has continued to decline (blue shading in top panel). An idealized tracer reveals enhanced tropical-extratropical mixing between 1998 and 2016 (bottom panel). This implies that transport changes between 1998 and 2016 most likely caused ozone in the extratropical lower stratosphere to decline. Either long-term variations or a systematic change in mixing are to blame.