



Supplement of

Analysis of global trends of total column water vapour from multiple years of OMI observations

Christian Borger et al.

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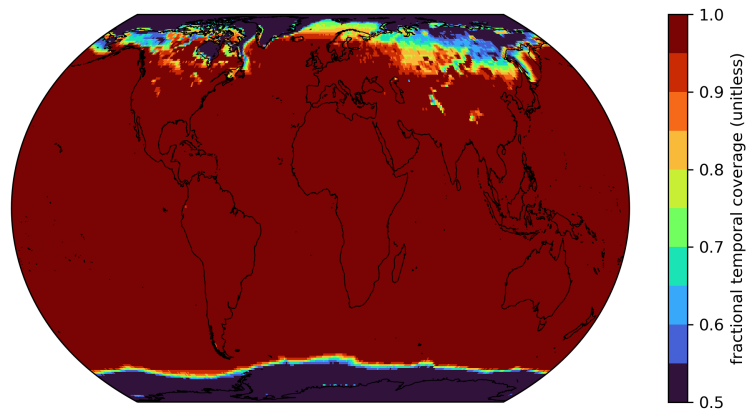


Figure S1. Fractional temporal coverage of the MPIC OMI TCWV data set for the time range January 2005 to December 2020.

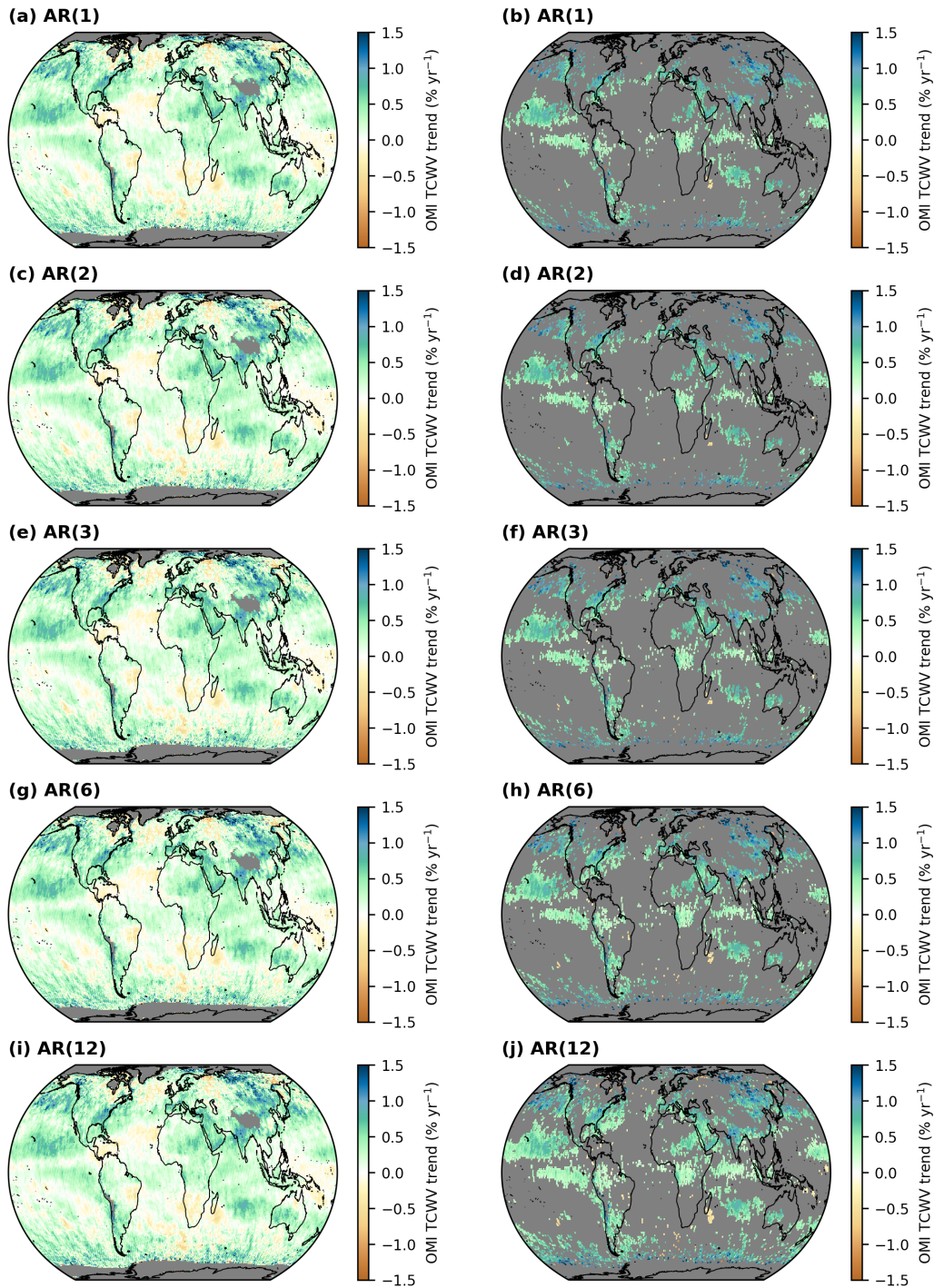
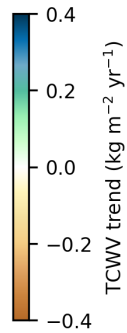
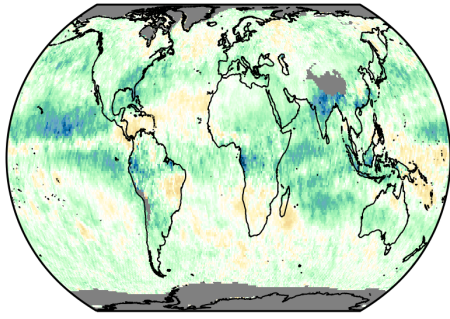
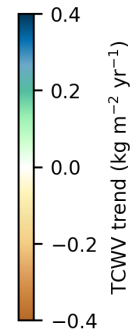
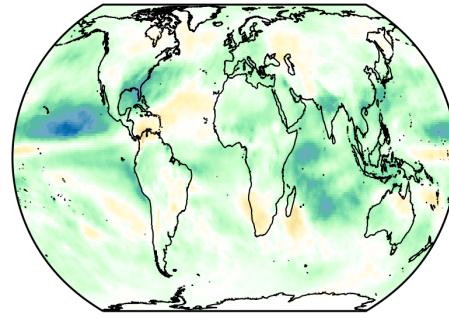


Figure S2. Global distributions of relative TCWV trends (2005-2020) derived from the MPIC OMI TCWV data set using different AR-models. Panels (a), (c), (e), (g), and (i) depict the all calculated relative TCWV trends assuming a AR(1), AR(2), AR(3), and AR(6) process for the fit residuals, respectively. Panels (b), (d), (f), (h), and (j) depict significant relative trends, respectively, after the application of the Z-test and FDR test. Grid cells for which no trend could be calculated and/or for which the trends do not fulfill the significance criteria are coloured grey.

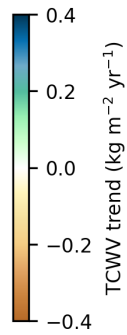
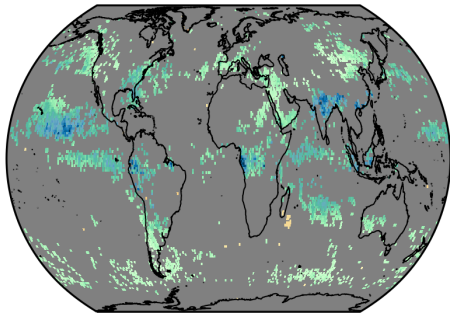
(a) OMI, 2005-2020



(b) ERA5, 2005-2020



(c) OMI, 2005-2020



(d) ERA5, 2005-2020

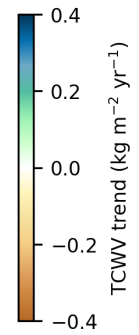
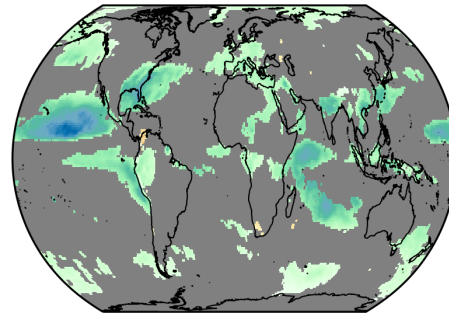
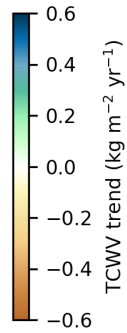
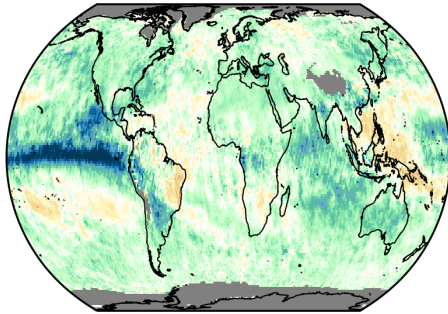
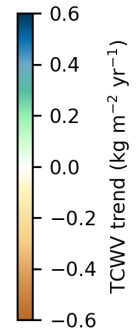
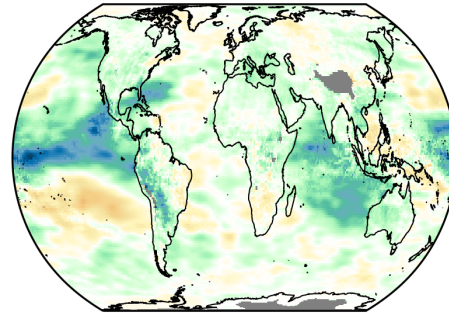


Figure S3. Global distributions of absolute TCWV trends derived from the MPIC OMI TCWV data set (left column) and ERA5 (right column). Panels **(a)** and **(b)** depict all calculated absolute TCWV trends and panels **(c)** and **(d)** the corresponding significant trends remaining after the application of the Z-test and FDR test. Grid cells for which no valid trend could be calculated are coloured grey.

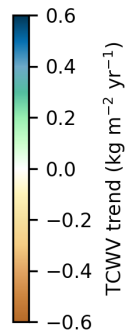
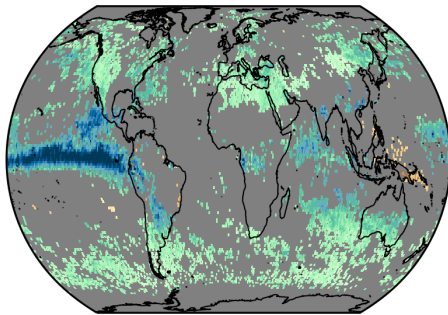
(a) OMI, 2005-2015



(b) GOME-Evolution, 2005-2015



(c) OMI, 2005-2015



(d) GOME-Evolution, 2005-2015

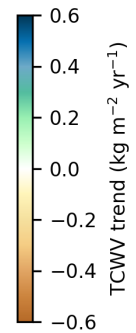
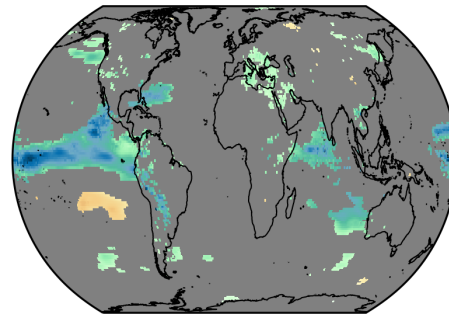
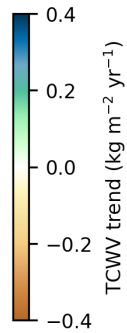
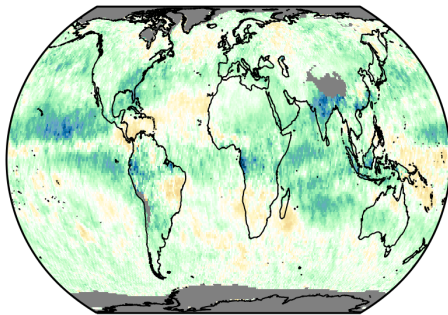
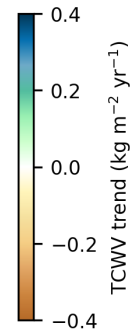
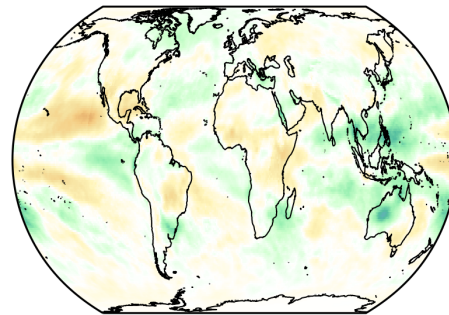


Figure S4. Global distributions of absolute TCWV trends derived from the OMI TCWV data set (left column) and GOME-Evolution (right column) for the time range from January 2005 to December 2015. Panels (a) and (b) depict all calculated absolute TCWV trends and panels (c) and (d) the corresponding significant trends remaining after the application of the Z-test and FDR test. Grid cells for which no valid trend could be calculated are coloured grey.

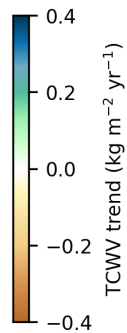
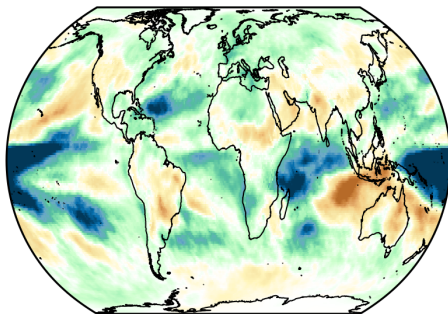
(a) OMI, 2005-2020



(b) ERA5, 1988-2003



(c) ERA5, 1996-2006



(d) ERA5, 1995-2011

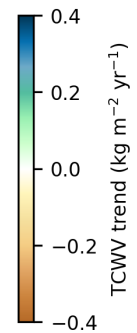
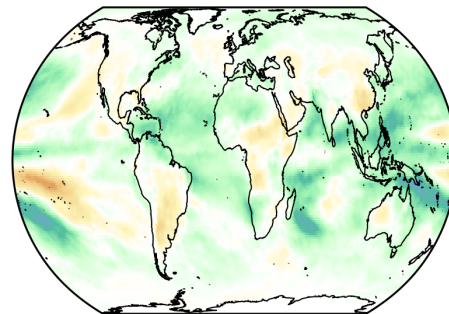


Figure S5. Global distributions of absolute TCWV trends of OMI (2005-2020; Panel **(a)**) and ERA5 for different time periods: **(b)** 1988-2003; **(c)** 1996-2006; and **(d)** 1995-2011. Grid cells for which no valid trend has been calculated are coloured grey.