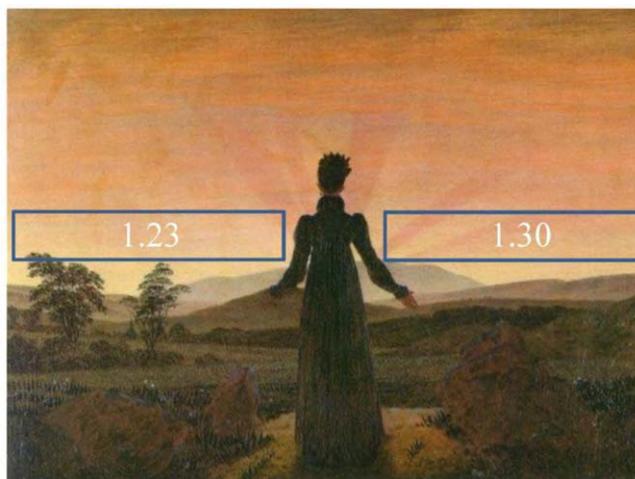


Art and air pollution

Sunsets as measure of aerosol optical depth

Using the red-to-green (R/G) ratio in paintings of sunsets from 1500-2000 with an updated technique, Zerefos et al. (2014) create a historical record of aerosol optical depth (AOD) values that are well-aligned with other techniques. This current paper builds off of an earlier paper (Zerefos et al., 2007) where an analysis of sunsets was performed on digital images of 554 photos that were downloaded from several art galleries and museums. This previous study found that despite the style or the school of the painter, the R/G ratios at low solar zenith angles correlated well with modelled AOD values following large volcanic eruptions. In their 2014 paper, the authors were able to analyse 124 digital images from the Tate gallery and compare with the analysis of the pictures from the website, and found very similar results. In addition, the team ran an experiment where an artist painted a sunset during and after the Greek island of Hydra was impacted by a Saharan dust storm, and the AOD was measured simultaneously. During the high dust event there was a 30% difference between the AOD derived from the painting and the measured, however there was only a 0.02 difference in the AOD between the painting and the measured values during the low dust event. For both events, there was strong agreement with AOD from the painting and from a high resolution picture of the painting. This paper presents a very novel way to create a historical record of AOD, which can be used to identify when the global atmosphere as impacted by volcanoes, as well as the impact of the industrial revolution. The authors estimate that the AOD increases from 0.15 in the middle of the 19th century to about 0.20 by the end of the 20th century. As they conclude, “The main conclusion of the paper is that nature speaks to the hearts and souls of artists. When colouring sunsets the R/G ratios perceived by the brain contain important environmental information.”



“Caspar David Friedrich, Woman in front of the Setting Sun, 1818.

Taken from Zerefos et al. (2014). The corresponding R/G ratios were averaged inside of each box.”

CS Zerefos, P Tetsis, A Kazantzidis, V Amiridis, SC Zerefos, J Luterbacker, K Eleftheratos, E Gerasopoulos, S Kazadzis and A Papayannis. (2014) Further evidence of important environmental information content in red-to-green ratios as depicted in painting by great masters. *Atmospheric Chemistry and Physics*. 14:4987-3015

CS Zerefos, VT Gerogiannis, D Balis, SC Zerefos, and A Kazantzidis. (2007) Atmospheric effects of volcanic eruptions as seen by famous artists and depicted in their paintings. *Atmospheric Chemistry and Physics*. 7: 4027-4042.