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Reconstruction of Solar EUV flux 1834-2014

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Solar EUV creates the conducting E-layer of the ionosphere, mainly by photo ionization of molecular Oxygen. Solar heating of the ionosphere creates thermal winds which by dynamo action induce an electric field driving an electric current having a magnetic effect observable on the ground, as was discovered by G. Graham in 1722. The current rises and sets with the Sun and thus causes a readily observable diurnal variation of the geomagnetic field, allowing us the deduce the conductivity and thus the EUV flux as far back as reliable magnetic data reach. High quality data go back to the invention of the magnetometers by Gauss and Weber in 1834 and less reliable, but still usable, data are available sporadically for the hundred years before that. R. Wolf and, independently, J-A. Gautier discovered the dependence of the diurnal variation on solar activity, and today we understand and can invert that relationship to construct a reliable record of the EUV flux from the geomagnetic record. We compare that to the F10.7 flux and the sunspot number, and find that the reconstructed EUV flux reproduces the F10.7 flux with great accuracy and that the EUV flux clearly shows the discontinuities of the sunspot record identified by Clette et al, 2014.