Differing evolutions of the solar spectral variability in the EUV during the last solar minimum

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The solar spectral variability in the Extreme-UV (EUV) varies remarkably coherently, which suggests that a small number only of solar drivers are at play. Many authors have made use of this property to reconstruct parts of the EUV spectrum from solar proxies. Of particular interest are the changes undergone by this spectral variability during the last and unusual solar minimum. We investigate these changes by using a blind source separation approach: we use the coherency of the spectral variability to express it in terms of a linear combination of a few elementary spectra, using a Bayesian positive source separation technique. This analysis is based on 8 years of daily observations from TIMED/SEE.

The results consistently show that the salient features of the variability can be expressed by 3 elementary spectra only, in agreement with an earlier study [Amblard et al. A&A (2008)]. What is new, however, is the marked difference in the relative contributions of these elementary spectra before and after the last solar minimum, which suggests that a deep change has occurred in the EUV emission. This difference is much more apparent in the elementary spectra than in the raw irradiance records. Its possible causes will be discussed.