EPSC Abstracts
Vol. 12, EPSC2018-250, 2018
European Planetary Science Congress 2018

The effect of solar flares on comet 67P and RPC/LAP

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Abstract

We investigate the effects of solar flares on the coma of comet 67P as well as their influence on the photoelectron current from the RPC/LAP instrument. During the ~2 years Rosetta spent in the vicinity of comet 67P, ~4500 solar flares were observed to occur on the Sun, through X-ray flux measurements by the GOES satellite in orbit around Earth. 1600 of those occurred on regions on the Sun viewable from the vantage point of Rosetta, of all classes (A, B, C, M, X). We find that only a minority of the events have any noticeable effects on the measured photoelectron current by the Langmuir probe (LAP). We find little evidence of the flares having any effect on the cometary coma in terms of increased electron density. However, observing this is complicated due to the otherwise dynamic plasma environment in combination with measurement uncertainties. The effect on the plasma density is still under investigation. Only a few large solar flare events (X-class) were reported, whose intensity might be needed to cause any significant effects.