

## LARGEST SEP EVENTS OBSERVED ON BOARD «CORONAS-F» SATELLITE FROM AUGUST 2001

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The «CORONAS-F» satellite, the second one of CORONAS satellite series, was launched on July 31, 2001 into a circular orbit with altitude  $507\pm 21$  km and  $82.5^\circ$  inclination. The satellite was oriented towards the Sun and was equipped with the set of instruments for studies of solar flares and corresponding solar energetic particle (SEP) events. These instruments are intended for different energetic particles measurements – electrons 0.3-112 MeV, protons 1-90 MeV, alpha particles 23-35 MeV/n, CNO (up to Mg) nuclei 3-30 MeV/n. All charged particle detectors were oriented in the anti-Sunward direction. One of the instrument, SONG, was developed in cooperation of the Institutes (1) and (2). During time interval from August 14, 2001 (when we began to receive the data) to March 2002 more than ten solar flares leading to SEP were observed in different experiments. We have analyzed three most intensive SEP events, namely those observed after solar flares in September, 24, November, 4, and 23, 2001. We obtained SEP fluxes detected by «CORONAS-F» satellite in the polar caps, where it was during about 15 minutes every 47 minutes, and compared these data with GOES and ACE satellites ones. SEP generation and distribution were analyzed in view of conditions in the near-Earth interplanetary space. November 4 event is compared with ground based neutron monitor measurements (GLE62). Solar flare events September, 24 and November, 4 have taken place near to the central solar meridian. Flares September, 24 and November, 4 have generated CME and the powerful bow shock with an initial velocity about 1500-2000 km/s. Besides that the bow shock, generated by November, 4 event during CME propagation, interacted with CME ejected during November, 1 event. The event November, 22 was possibly connected with two flares observed with the time lag about three hours near to the western limb and have generated two interacting CME. The bow shock velocity in this event was also estimated about 2000 km/s. Values of bow shock velocity obtained according to our estimations in all three events exceed in 5-10 times the Alfvén wave velocity, since in all these SEP events the bow shock was the main source of energetic particles.