

Cross Calibration between Himawari-8/SEDA and GOES- 16/SEISS

T. Nagatsuma, K. Sakaguchi, and Y. Kubo

Space Environment Laboratory, Radio Research Institute, National
Institute of Information and Communications Technology

Acknowledgment: This research was supported by the Ministry of Internal Affairs and Communications, Japan, Research and Development of observing technology on Himawari satellite (JPJ010737) as Research and Development project on ICT priority technology (JPMI00316).

Space Environment Data Acquisition Monitor (SEDA) onboard Himawari-8,9



Items	Description
Number of Channels	Protons : 8 (individual 8 sensor elements) Electrons : 8 (8 stacked plates in one elements)
Energy Range	Protons : 20 MeV – 100 MeV Electrons : 0.2 MeV – 5 MeV
Time Resolution	10 sec.
Field of View	Protons : ± 39.35 deg. Electrons : ± 78.3 deg.



- High-energy particle environment over Japanese sector will be monitored by SEDA as housekeeping purpose.
- Near-real time SEDA data is provided from JMA to NICT. We have been provided SEDA data as part of space weather information.

Himawari-8 Launch: 2014/10/07

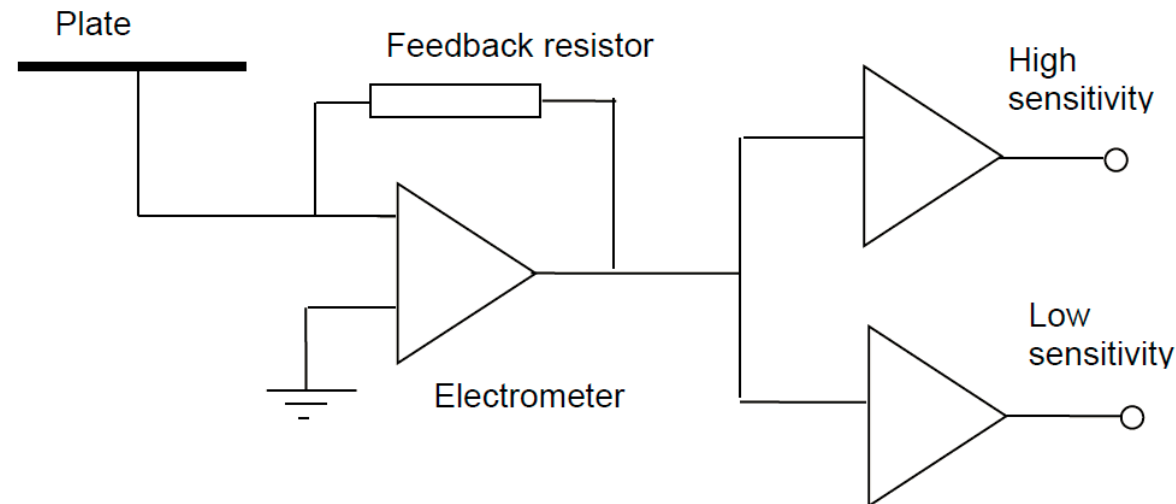
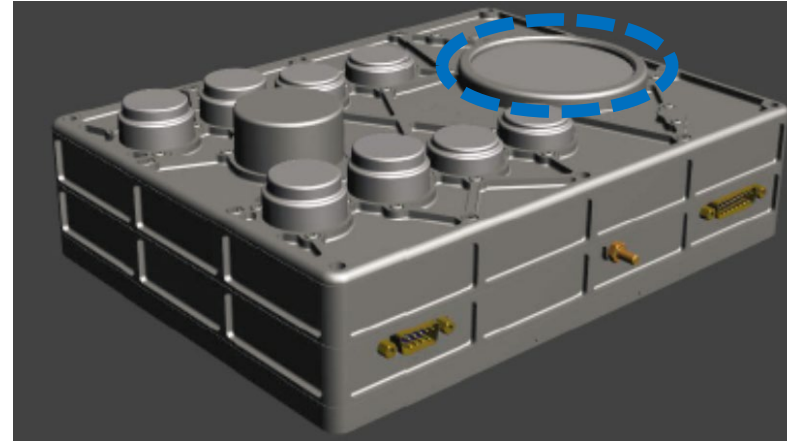
Himawari-9 Launch; 2016/11/02

Himawari-8/SEDA data is available from Nov. 03, 2014.



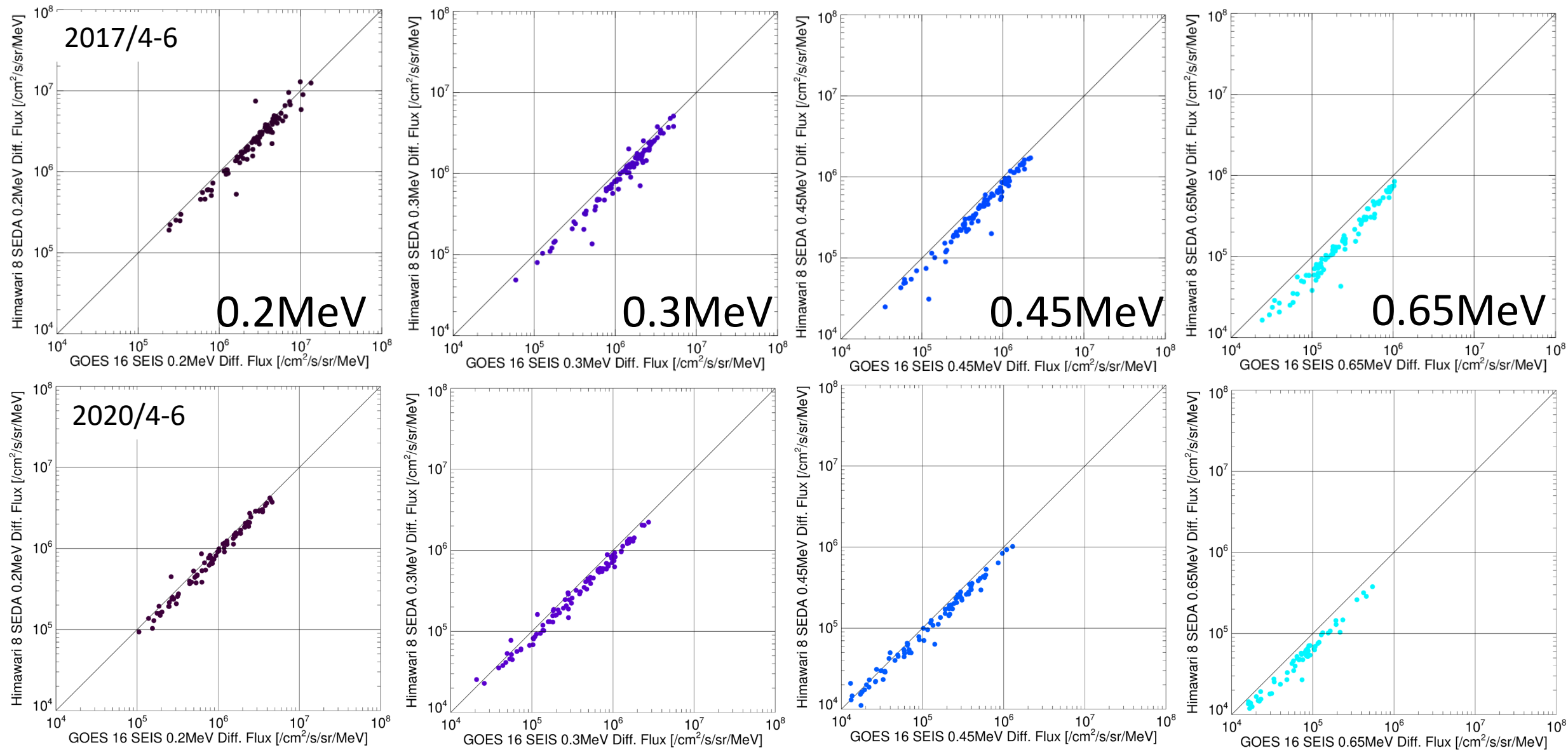
SEDA-e

Ch0: 0.2 MeV
Ch1: 0.3 MeV
Ch2: 0.45 MeV
Ch3: 0.65 MeV
Ch4: 1.0 MeV
Ch5: 1.5 MeV
Ch6: 2.0 MeV
Ch7: 4.5 MeV

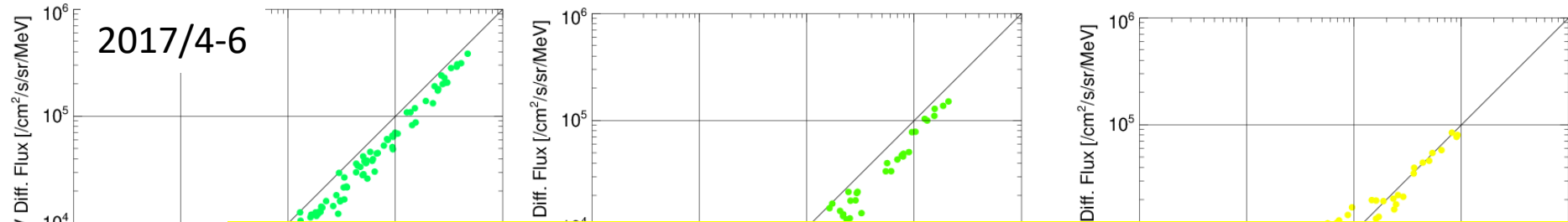


SEDA-e measures internal charging currents produced from high energy electrons (0.1 – 4.5 MeV) collected by 8 plates arranged in a stack. Electron fluxes are estimated from the charging currents. To estimate the charging currents, Bias current (voltage) needs to be subtracted. Bias current is a function of temperature, and it was estimated by experiment on the ground.

Comparison between 2017/04-06 and 2020/04-06(1/2)



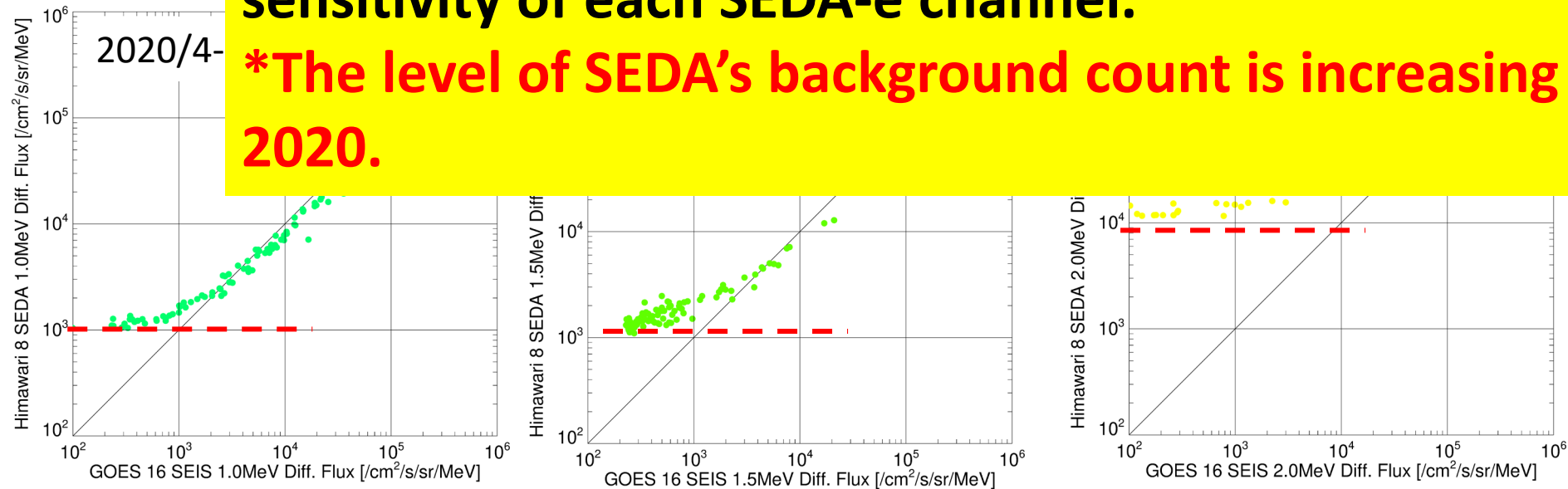
Comparison between 2017/04-06 and 2020/04-06(2/2)



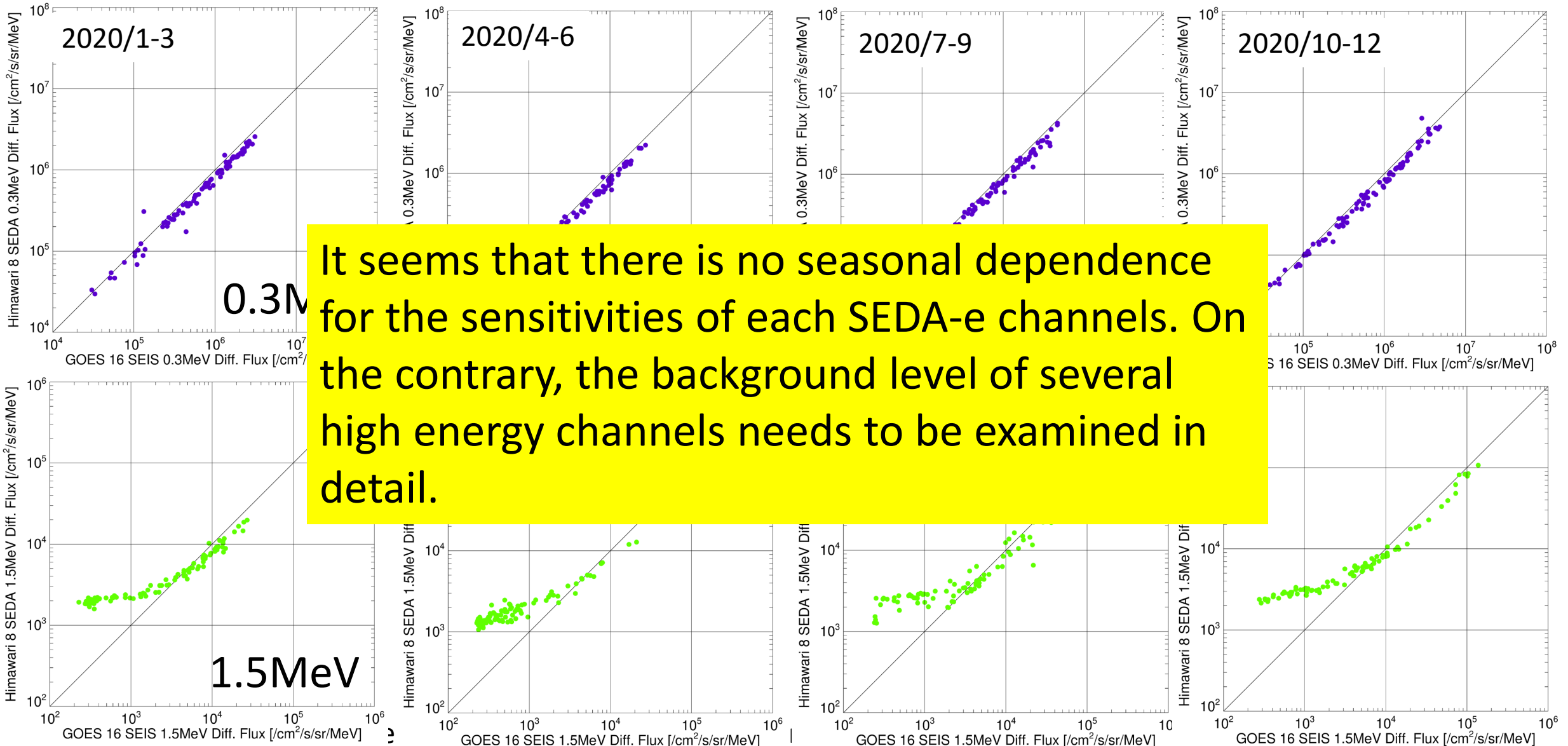
Our initial comparison between Himawari-8 and GOES 16 suggests that

***There is no significant long-term variation of the sensitivity of each SEDA-e channel.**

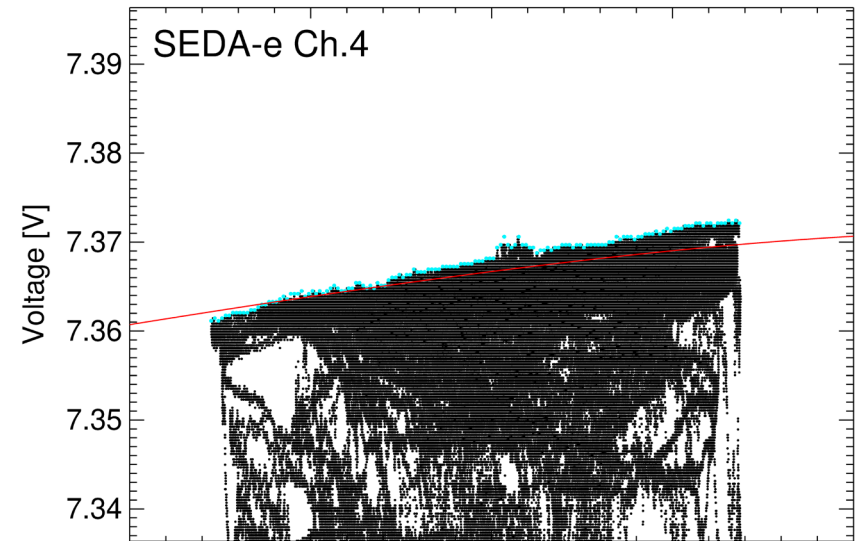
***The level of SEDA's background count is increasing in 2020.**



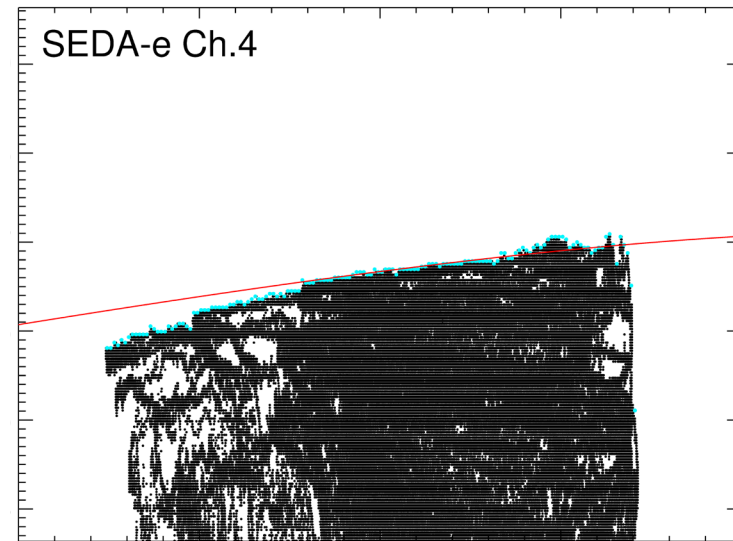
Seasonal dependence



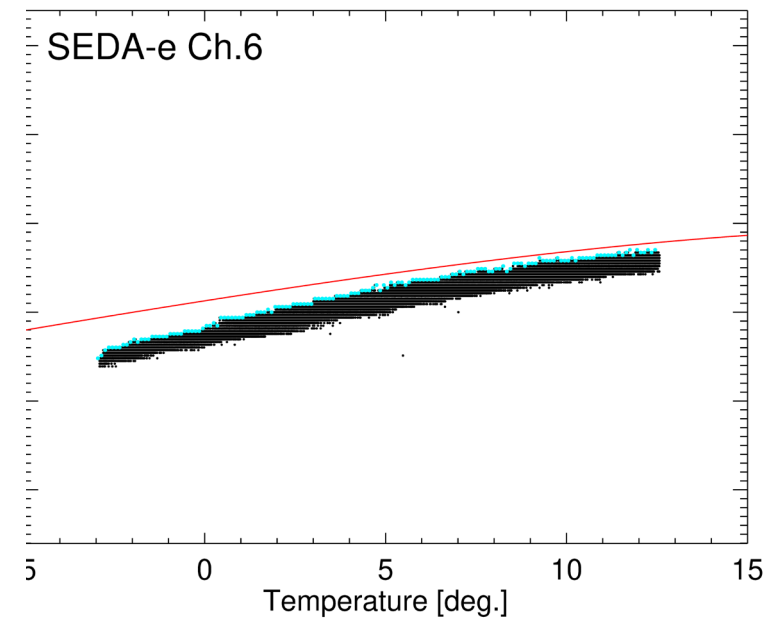
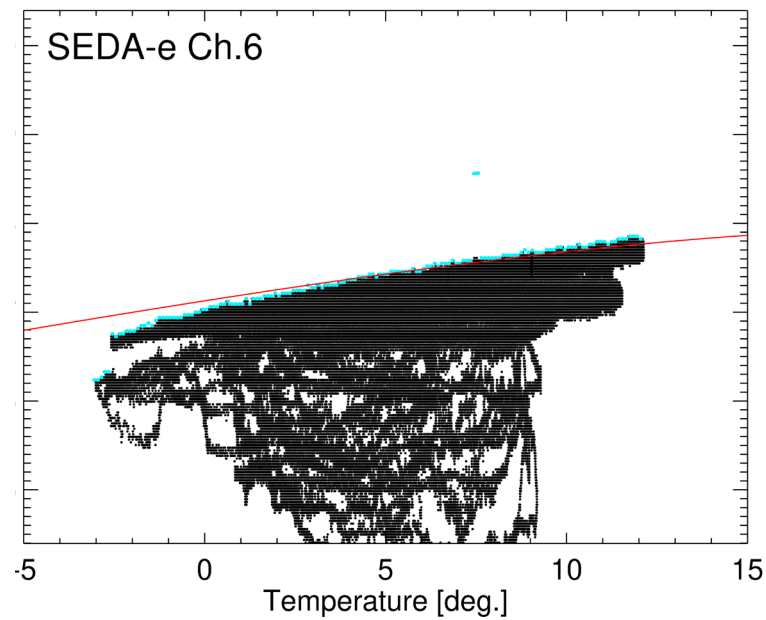
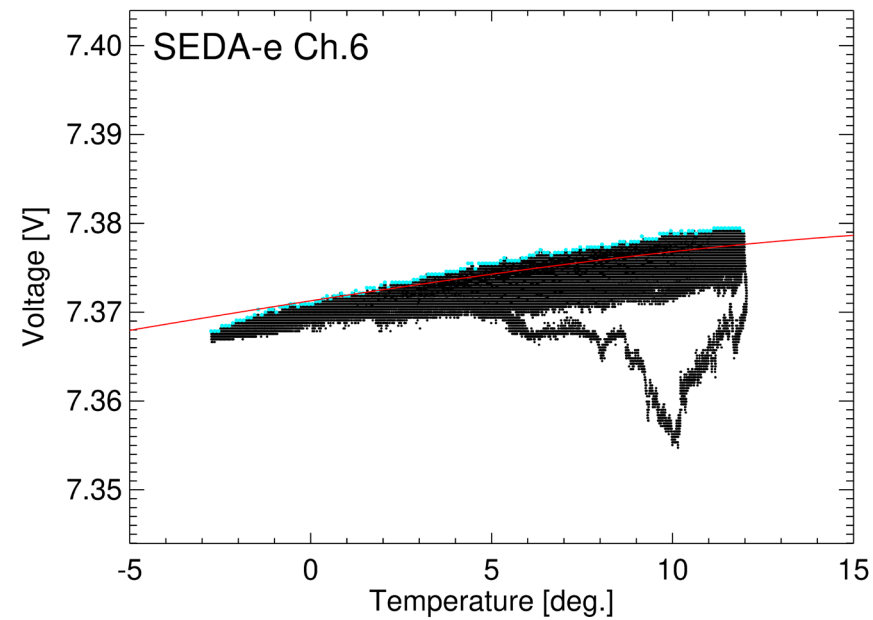
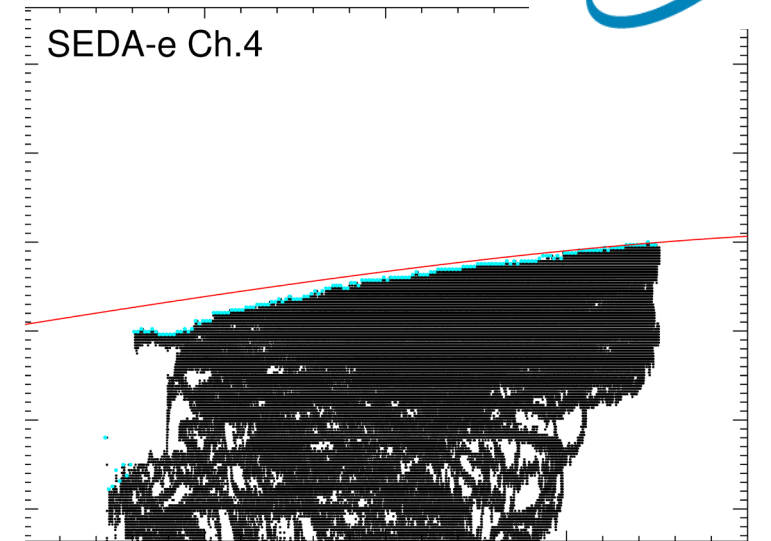
2015/04-06



2017/04-06



2020/04-06



Summary

- We have done cross-calibration between high energy electron sensor of the Himawari-8/SEDA(SEDA-e) and that of GOES-16/SEISS.
- The comparison between the period of 2017/04-06 and that of 2020/04-06 suggests as follows;
 - There is no significant long-term variation of the sensitivity of each SEDA-e channel.
 - The level of SEDA's background count is increasing in 2020. It seems BIOS voltage seems to change as time goes on.
- There is no seasonal dependence for the sensitivities of each SEDA-e channels. On the contrary, the background level of several high energy channels needs to be examined in detail. Increasing of bias current may play a role of enhancement of background count level.