



IGE2006: From raw data to a specification model

S. Bourdarie (ONERA), A. Sicard (CNES), D. Boscher (ONERA), D. Lazaro (ONERA), R. Ecoffet (CNES), G. Rolland (CNES)



r e t u r n o n i n n o v a t i o n

Office National d'Études
et de Recherches Aérospatiales
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Introduction

- Data base
- Data quality
- Model development
- Conclusions



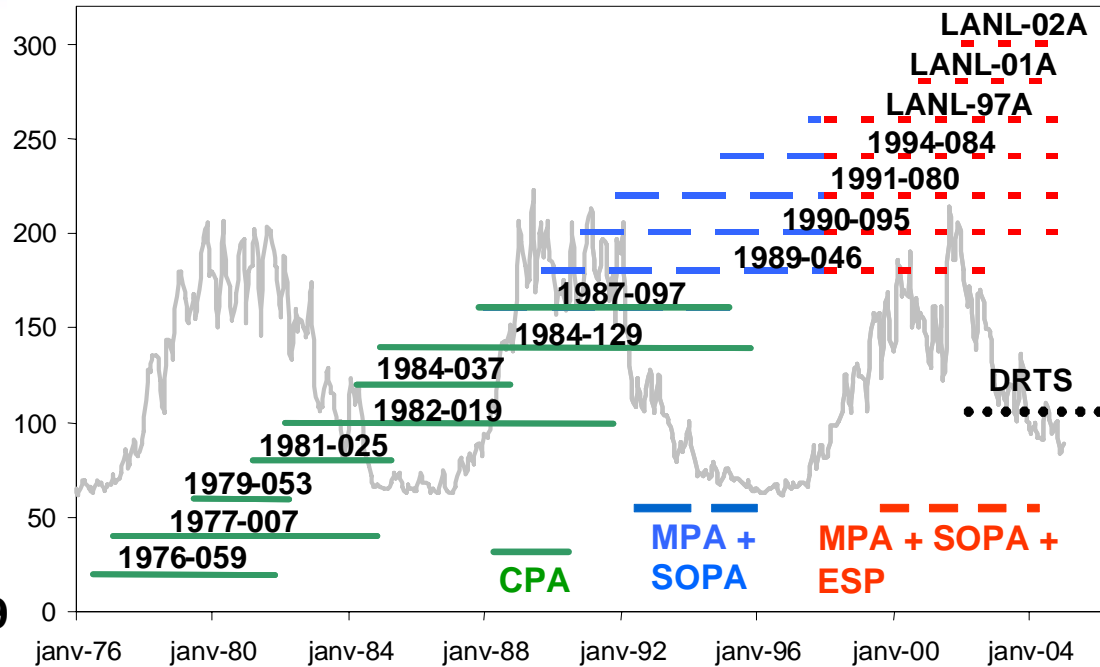
IPSAT V2.2

GEO data – 31 years – 10 s time res !

Over the period 1976 to present, three different detectors were flown on board LANL geostationary satellites:

CPA (Charged Particle Analyzer)
30 keV to 2 MeV
with 12 differential channels
from 1976 to 1988

SOPA (Synchronous Orbit Particle Analyzer) : 50 keV to 1.5 MeV with 9 differential channels since 1989



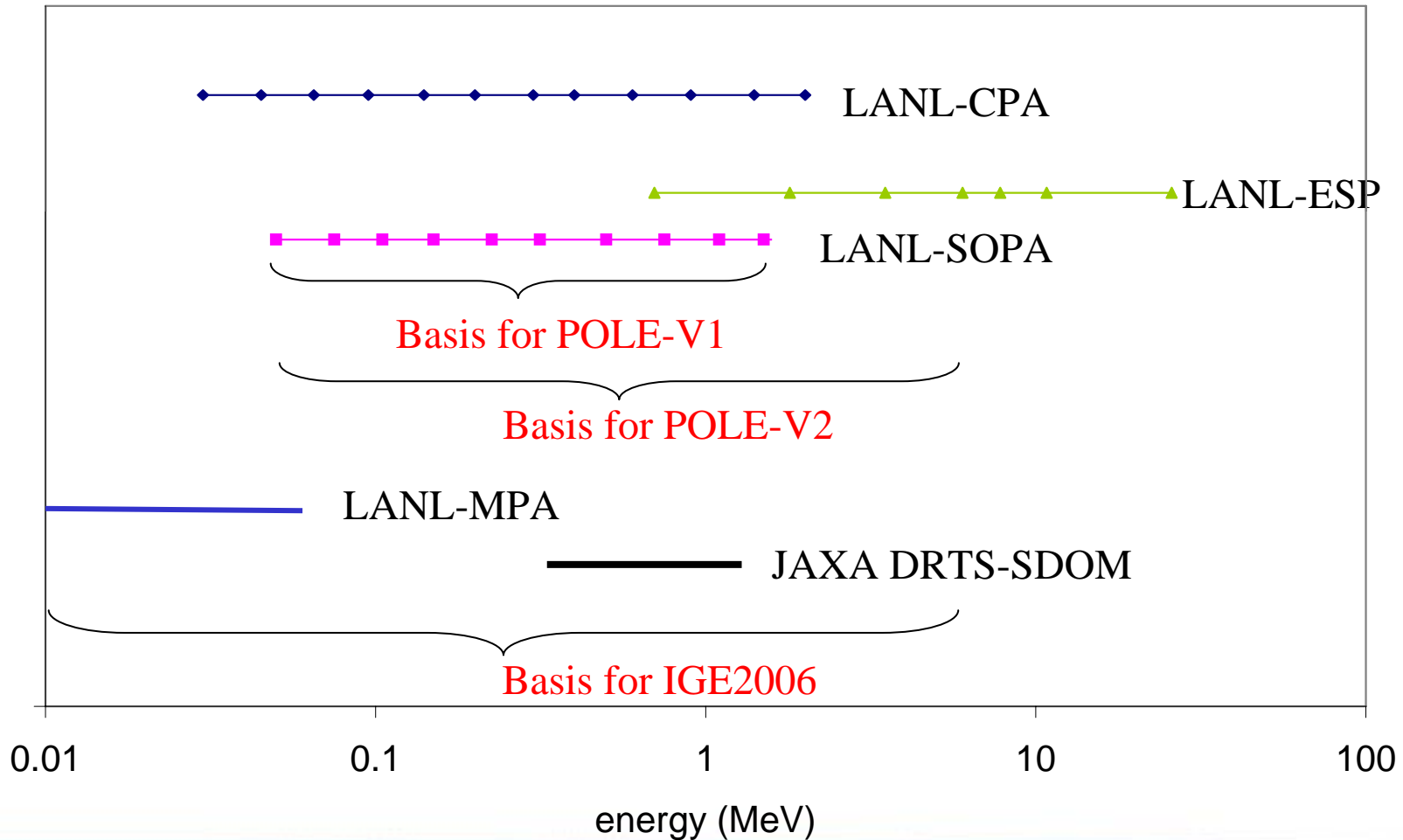
ESP (Energetic Spectra for Particles) : 0.70 MeV to 25.8 MeV with 9 channels

Over the period 2002 to 2006, one radiation monitor was flown on board the JAXA DRTS geostationary satellite:

SDOM (Standard Dose Monitor) few hundreds keV to few MeV

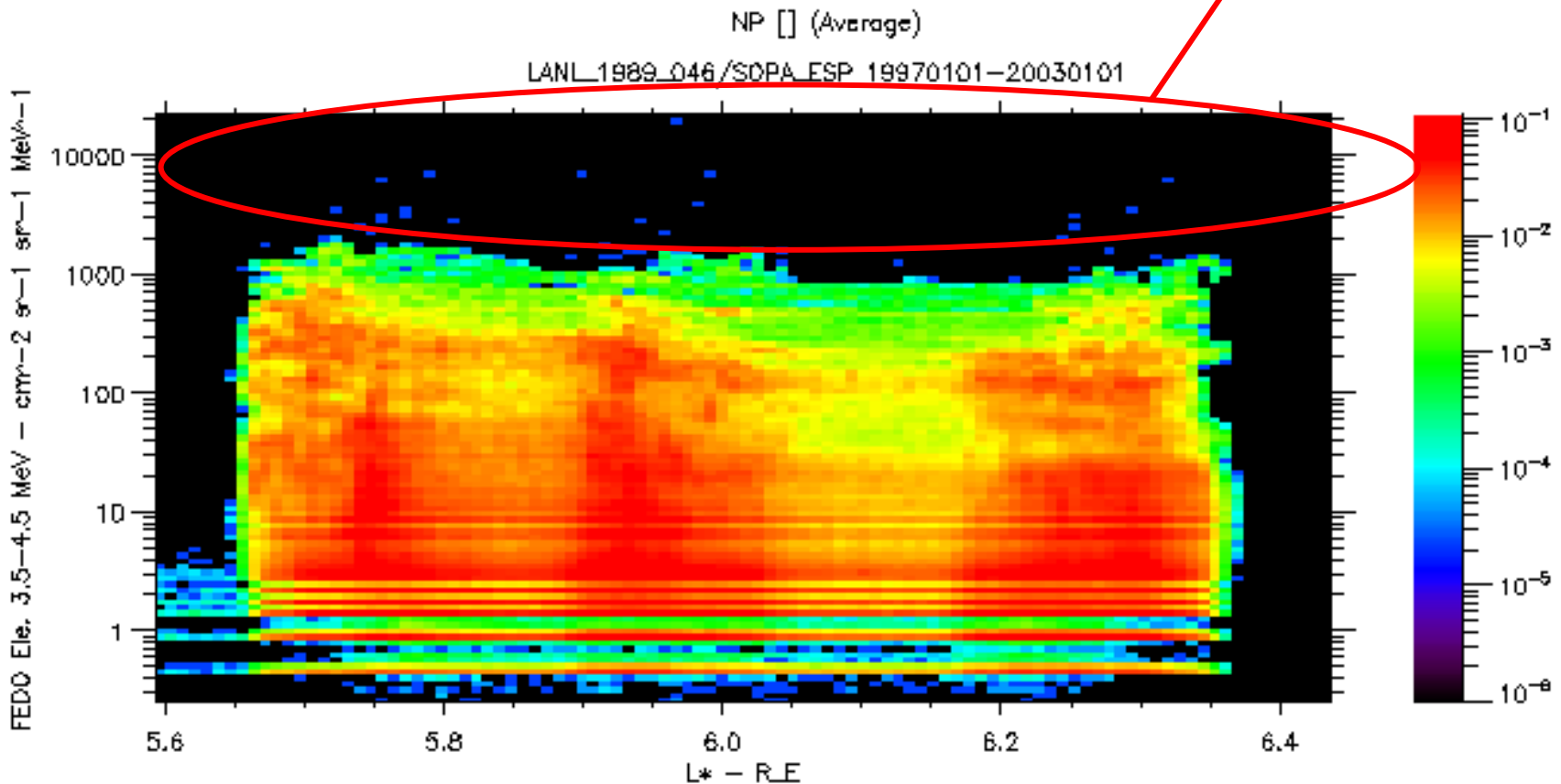
GEO data – Energy coverage

Energy range of the instruments

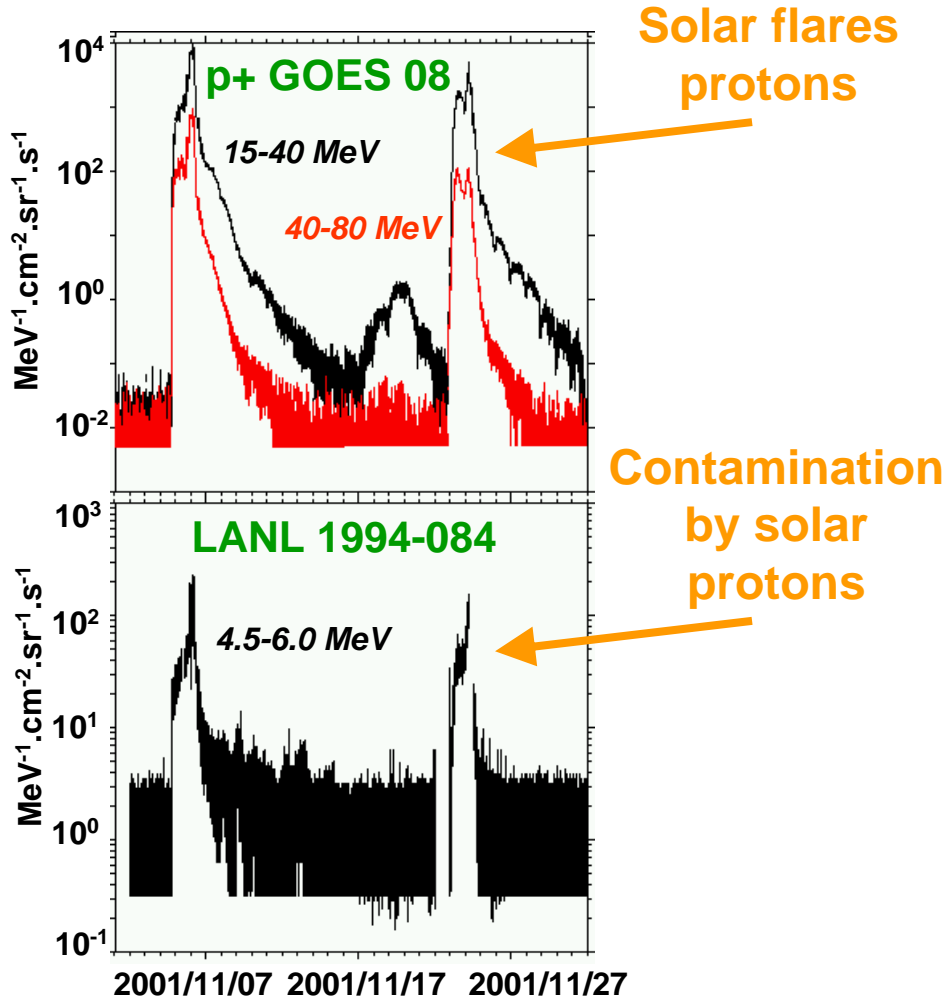


Data quality - Burst

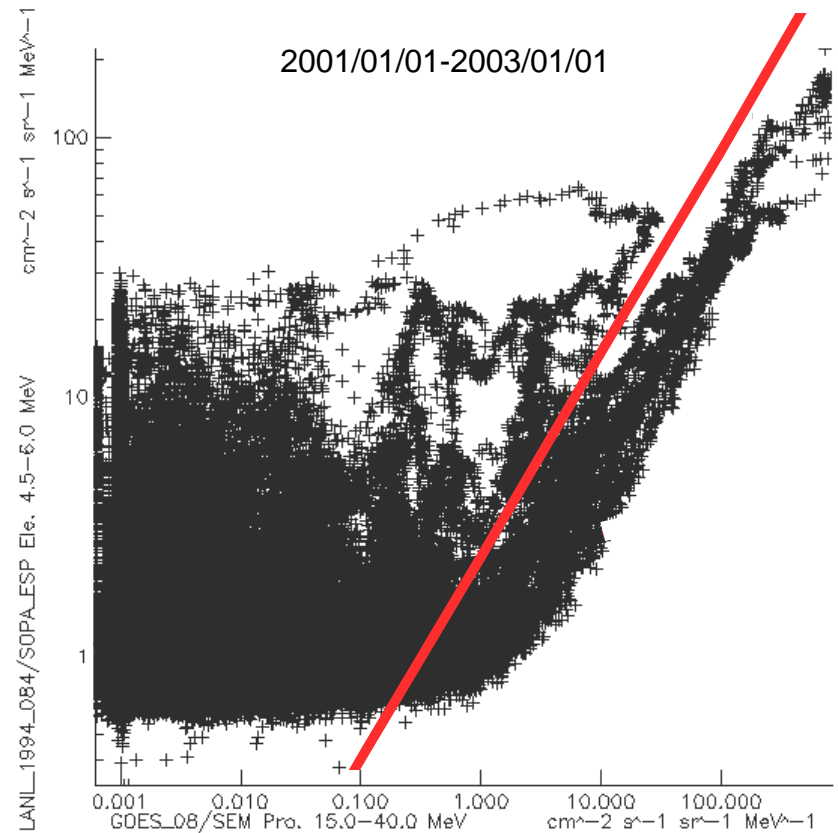
Burst to be removed



Data quality - Contamination

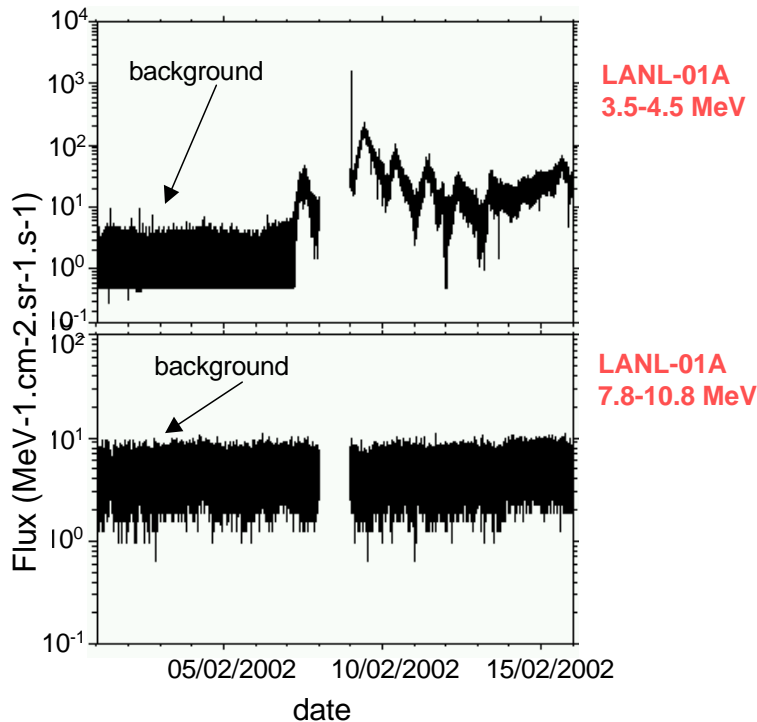


Decontamination of LANL- ESP electron channels



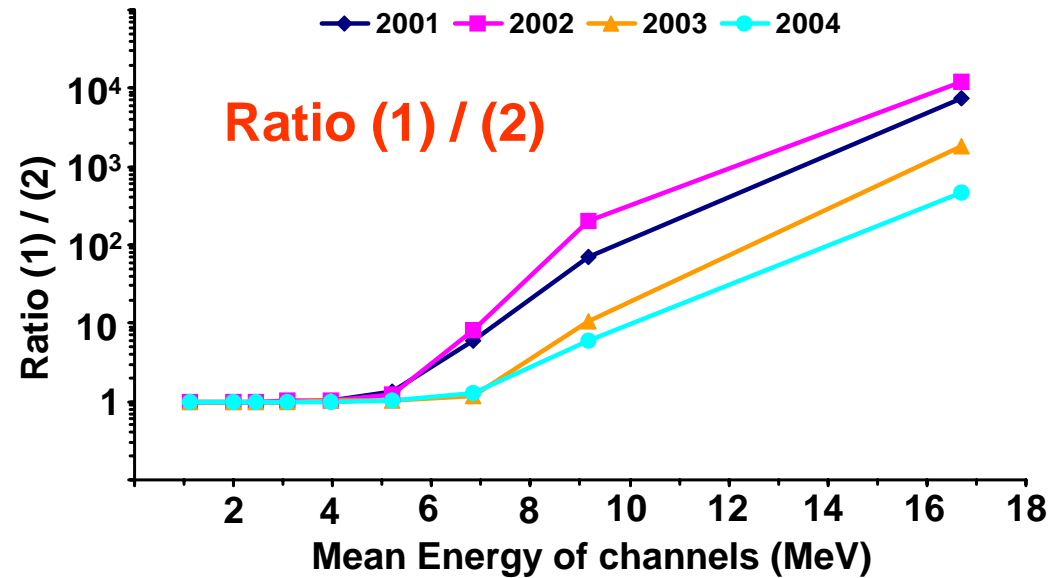
Data quality - Background

Definition of the background



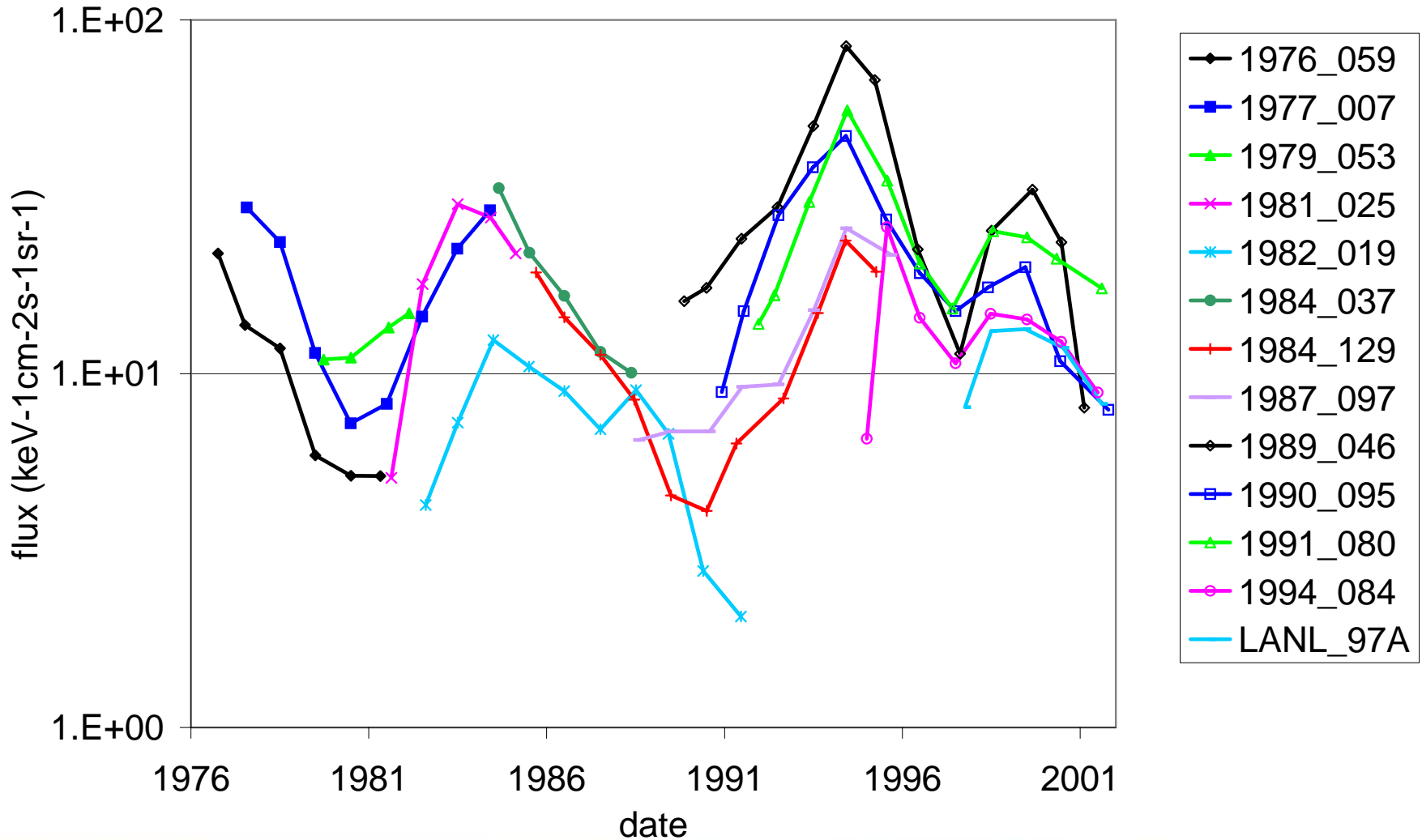
(1) year average electron flux calculated by considering background as electron measurements

(2) year average electron flux calculated by setting to 0 all flux lower than background value



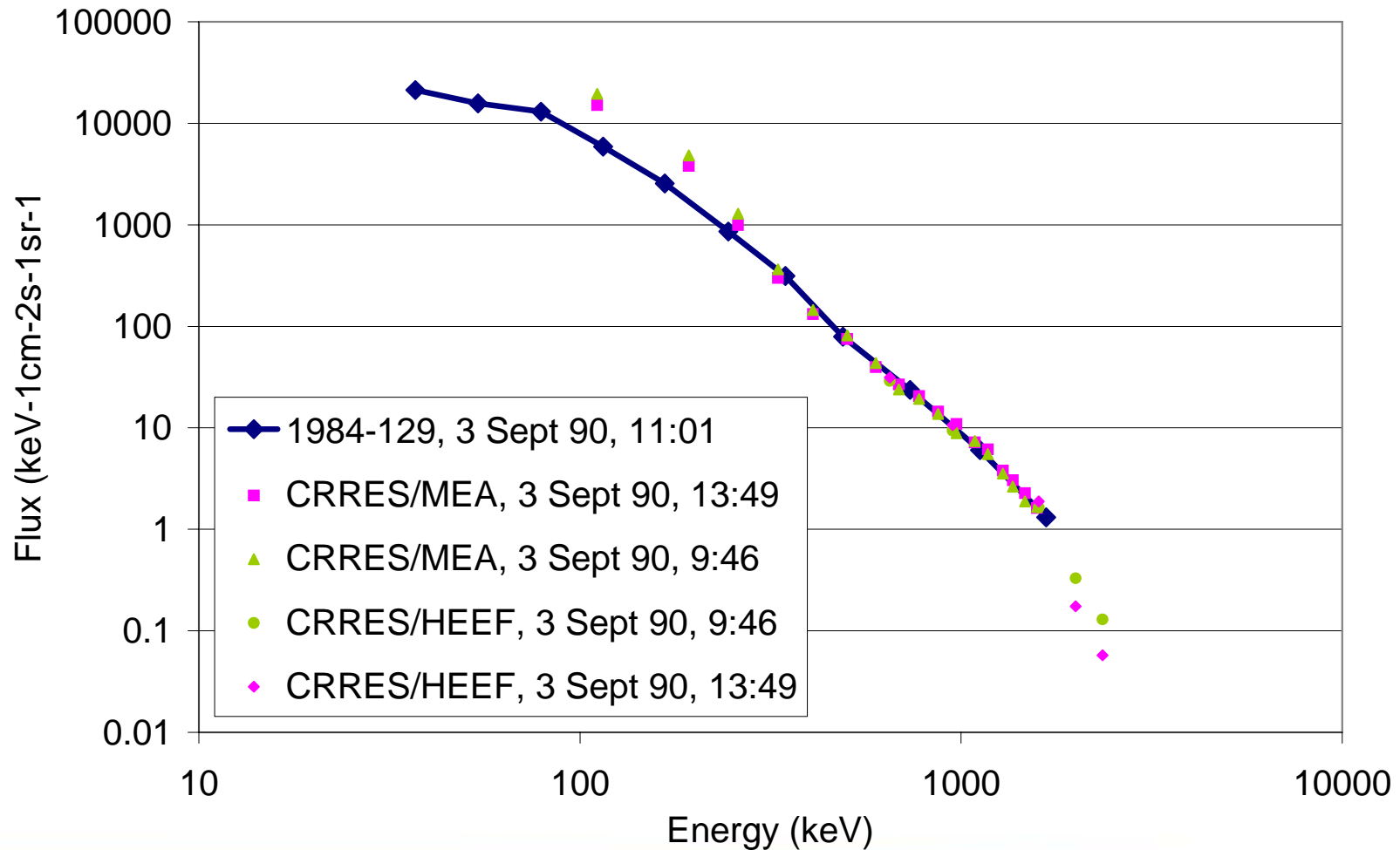
Model development

The raw flux for the 1100-1500 keV energy channel

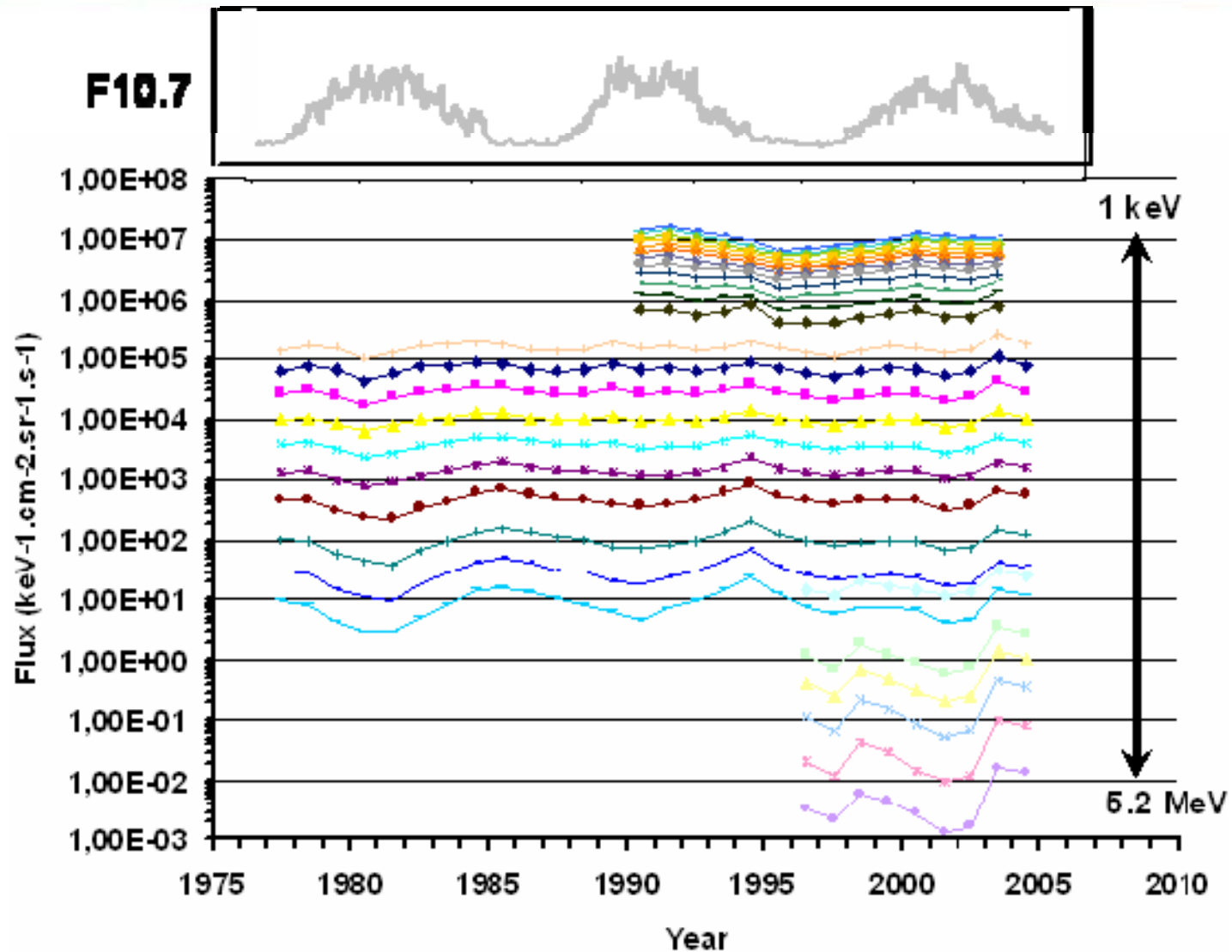


Model development – Detailed calibration

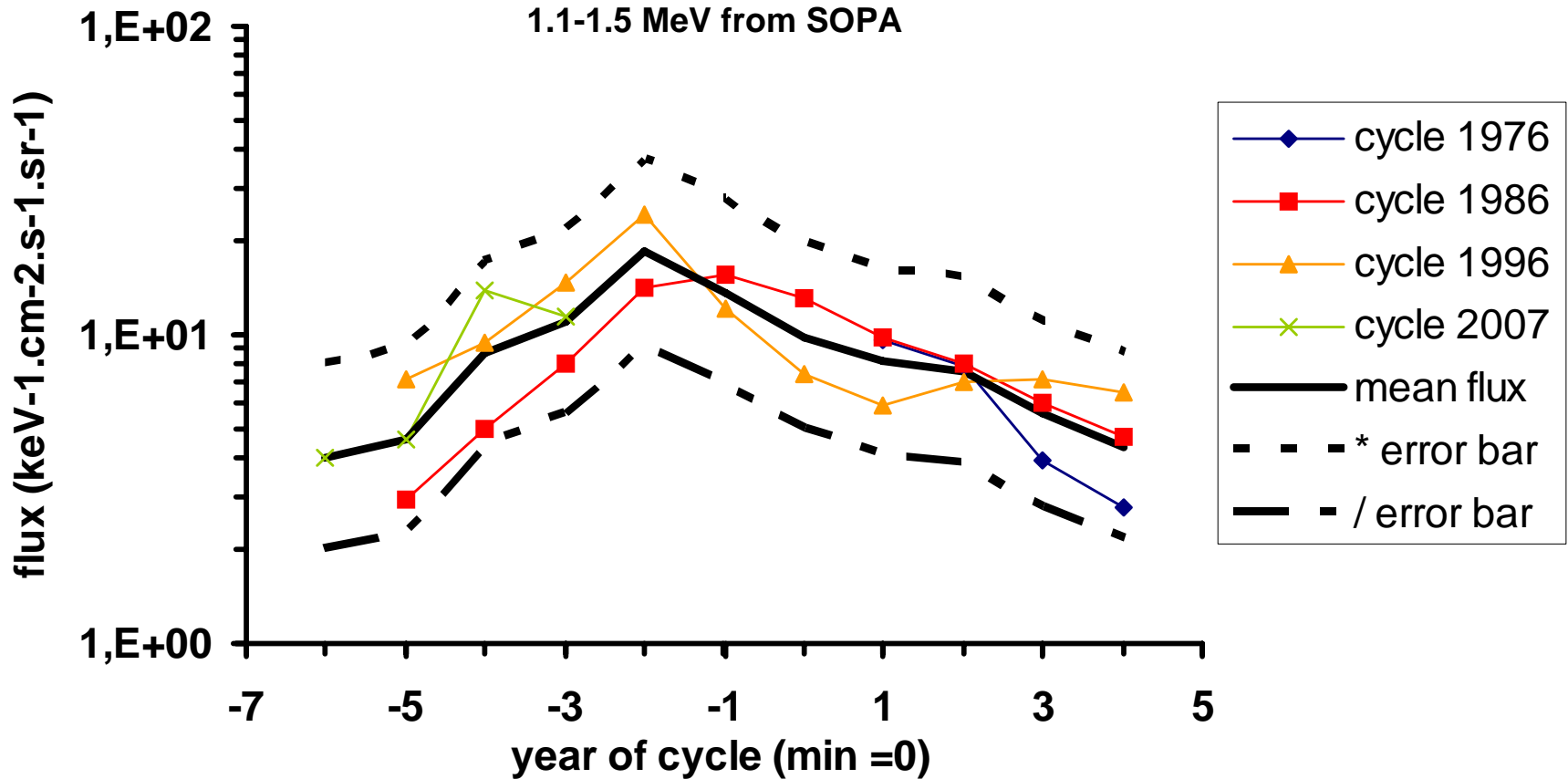
The data: Calibration of measurements; comparison with CRRES



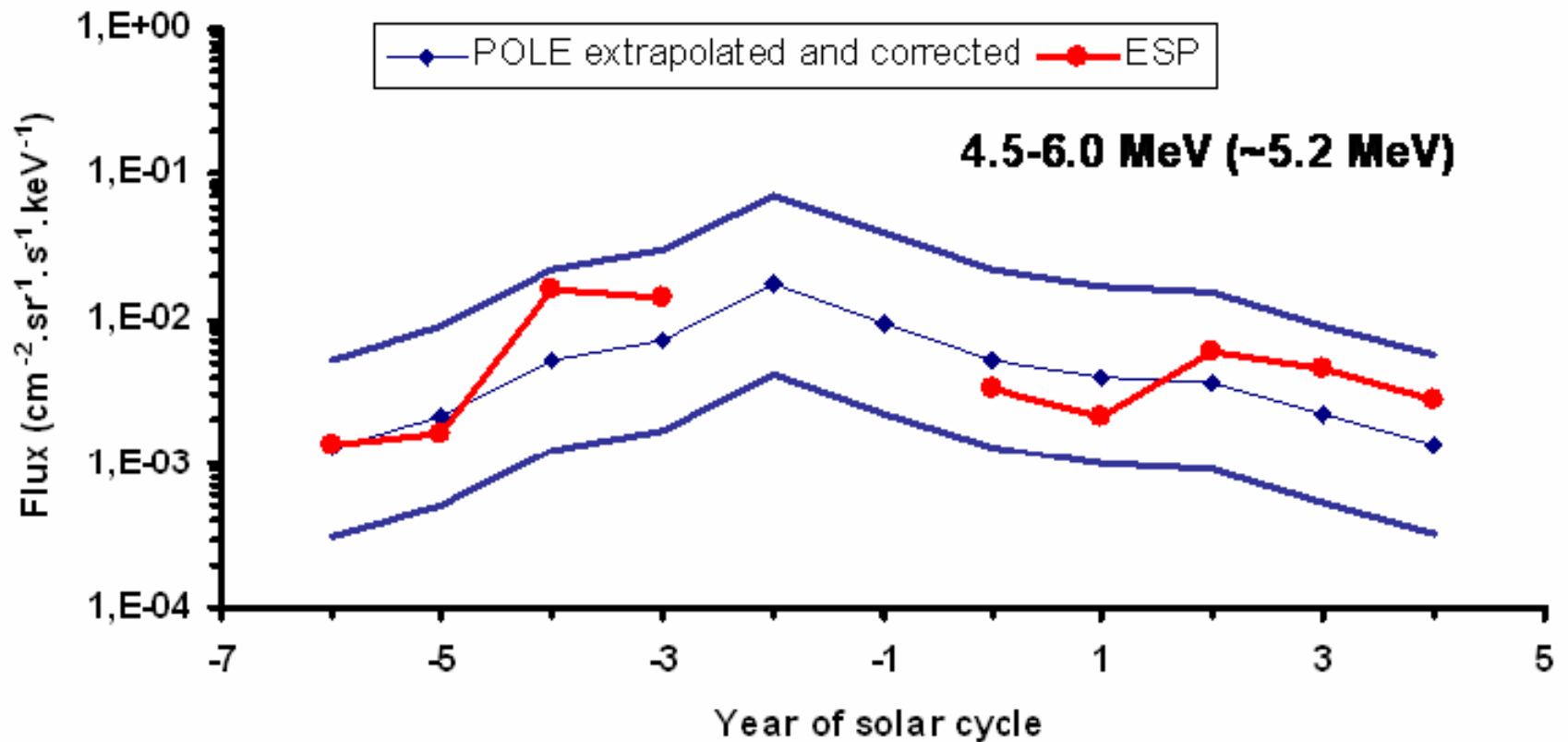
Model development



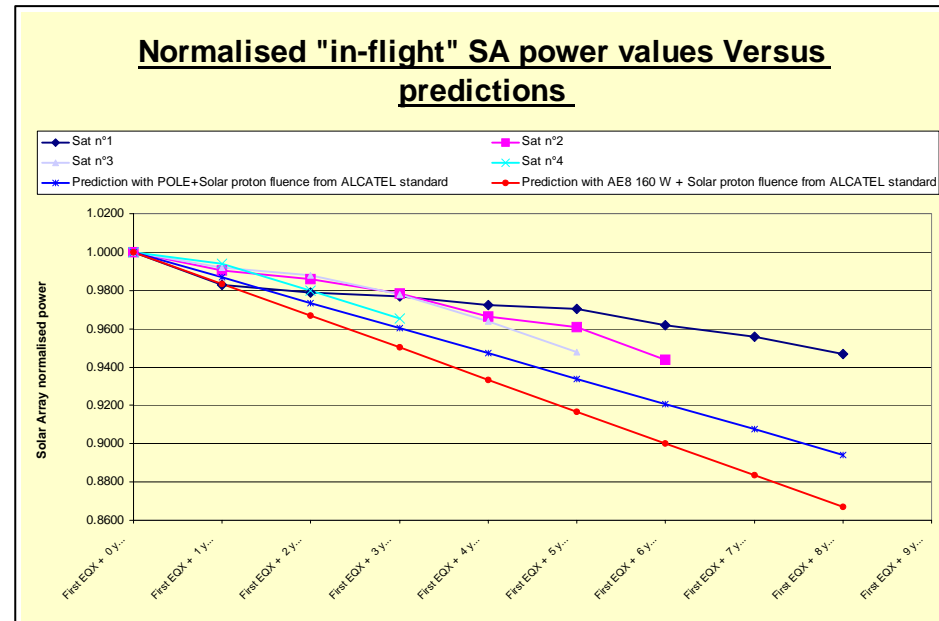
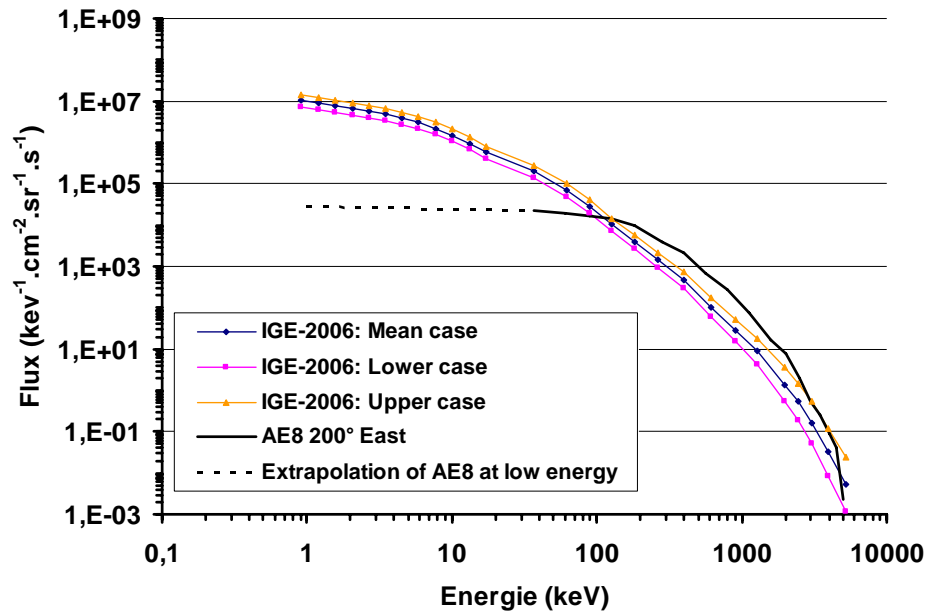
Model development – Error bars



Model development



Model development - Validation



Conclusions

- Going from raw in-situ data to a specification model is a long way!
 - Data must be sanitized
 - Data must be cross-calibrated (to be coherent)
 - Errors bars must be provided
- When data quality is good enough?
 - Need standard procedures to analyse data sets (see COSPAR-PRBEM standard procedures – now applied by ONERA, LANL, AFRL, Aerospace Corporation)
- End product based on any raw data must be validated with independent measures (like effect measurements).
 - Allows to make sure no artefact have been introduced in the raw data processing