DPS meeting report: Sputtering response on Mars

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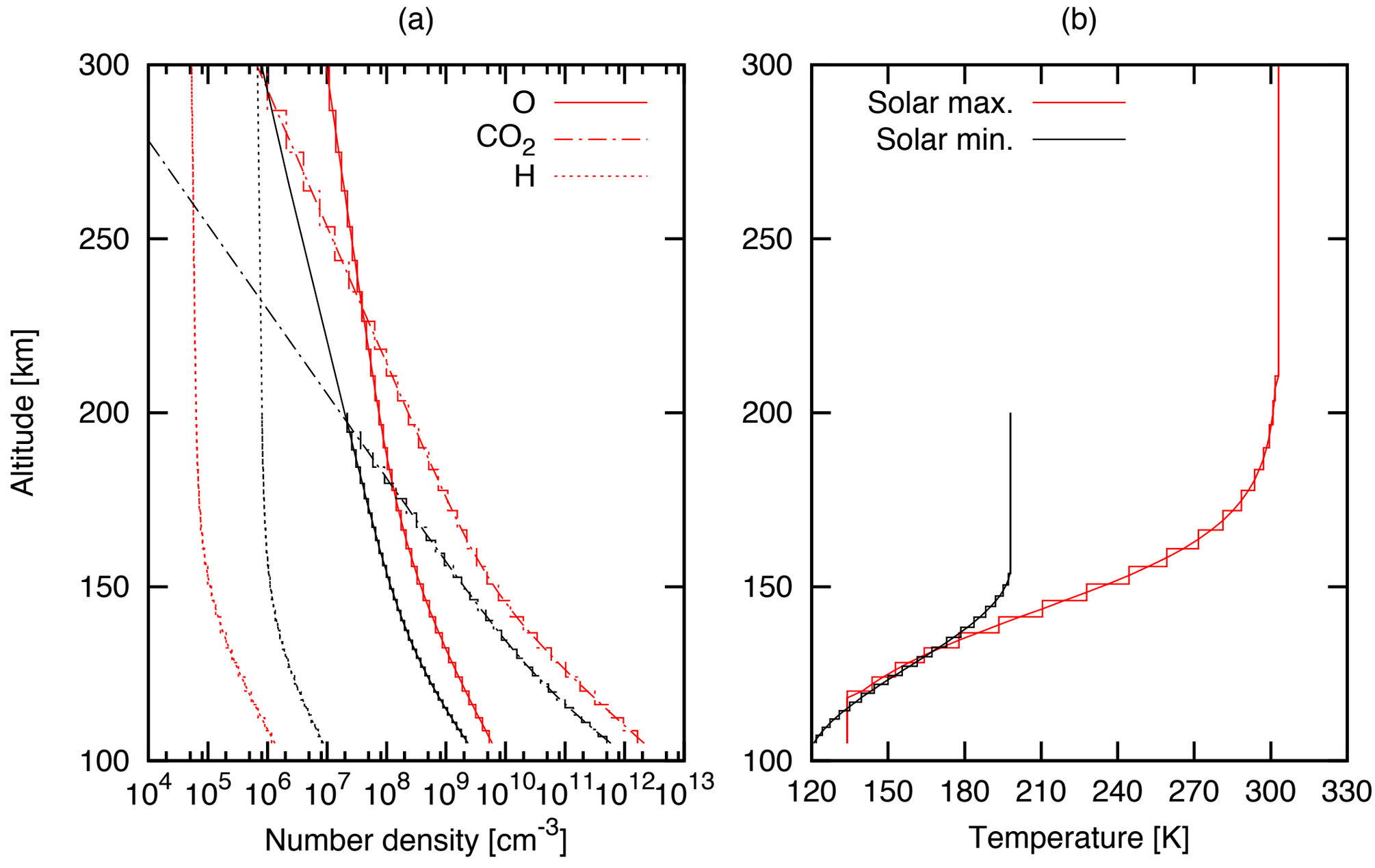
Add solar min. cases

Cases	n_{sw}	V_{sw}	IMF	Crustal field	Solar cycle
Quiet	4 cm^{-3}	400 km/s	3 nT Parker spiral	noon	Maximum
Active	4 cm^{-3}	1200 km/s	3 nT (B_y)	noon	Maximum
Extreme	20 cm^{-3}	1000 km/s	20 nT (B_y)	noon	Maximum
noonC	4 cm^{-3}	400 km/s	3 nT Parker spiral	noon	Minimum
dawnC	4 cm^{-3}	400 km/s	3 nT Parker spiral	dawn	Minimum
NoC	4 cm^{-3}	400 km/s	3 nT Parker spiral	Not included	Minimum

Atmospheres



Solar min. cases

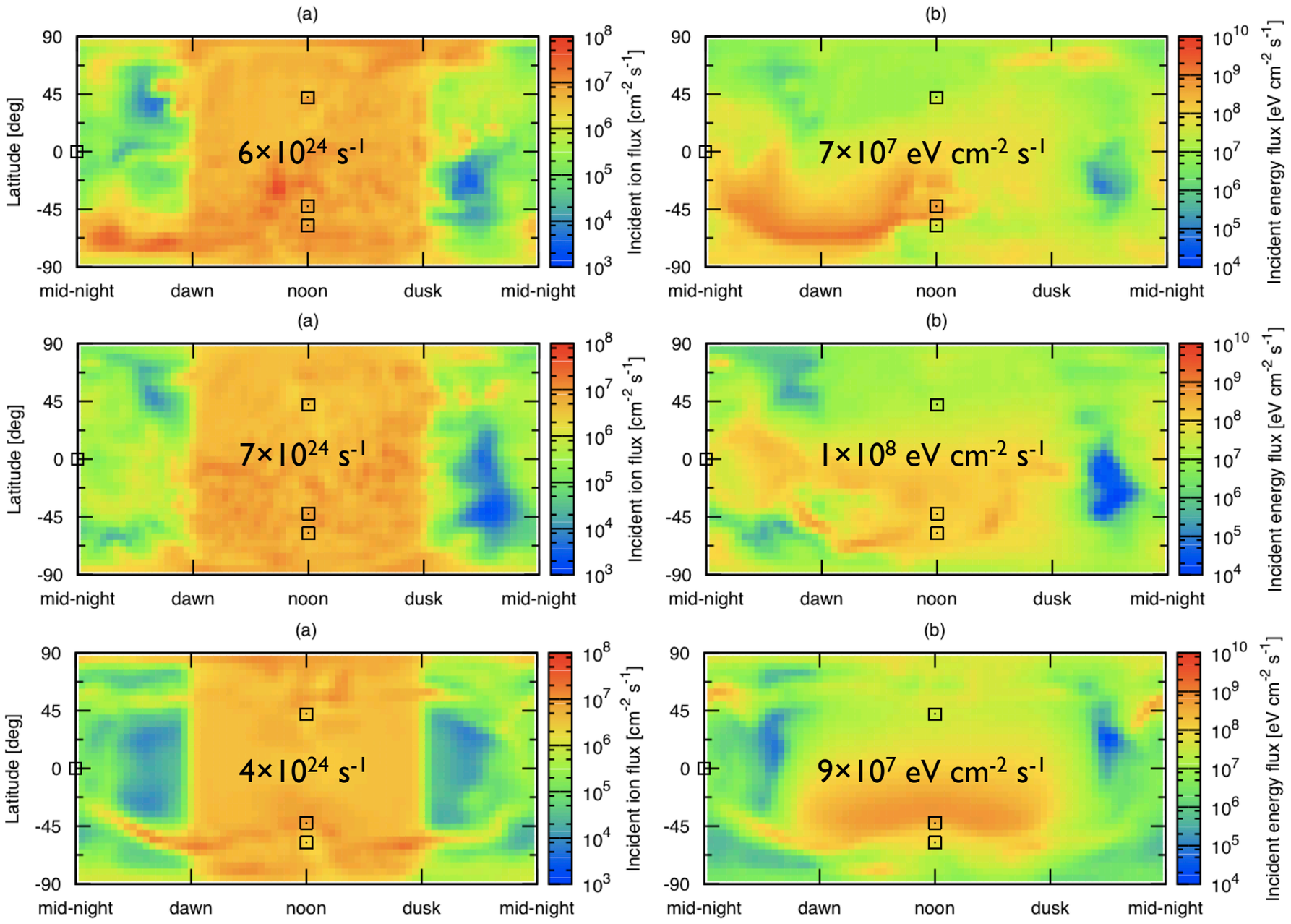
Pick-up O^+ flux

Pick-up O^+ energy flux

noonC

dawnC

NoC



Asymmetry due to Parker spiral IMF in [NoC] case

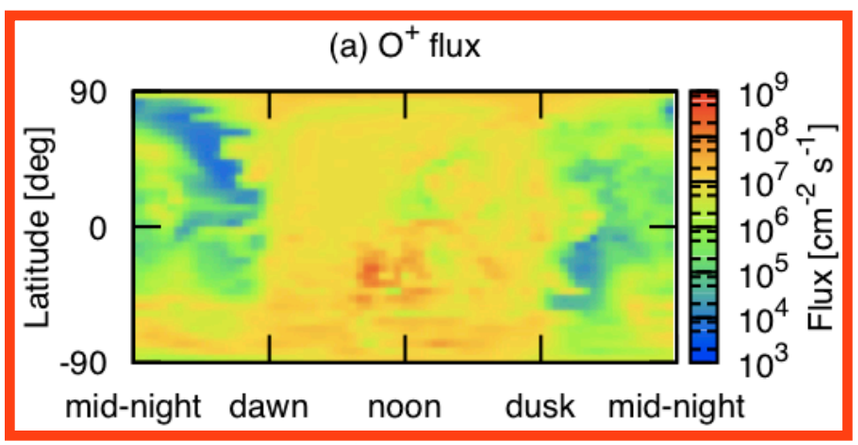
⇒ Toward or away IMF may also influence the orientation of the downstream tail.

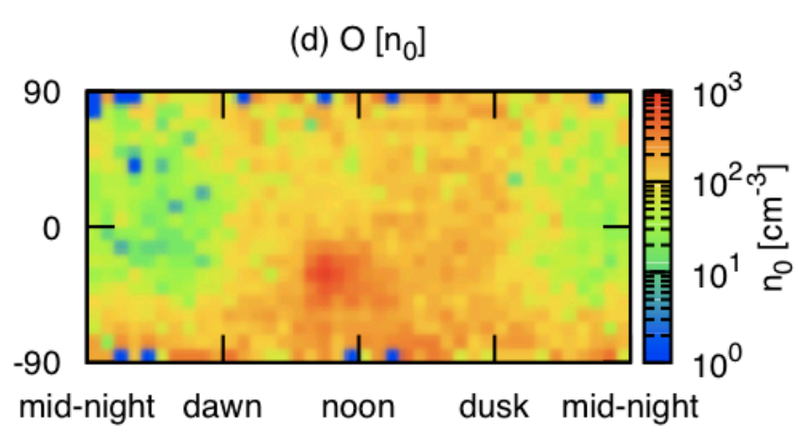
Pick-up O^+ precipitation

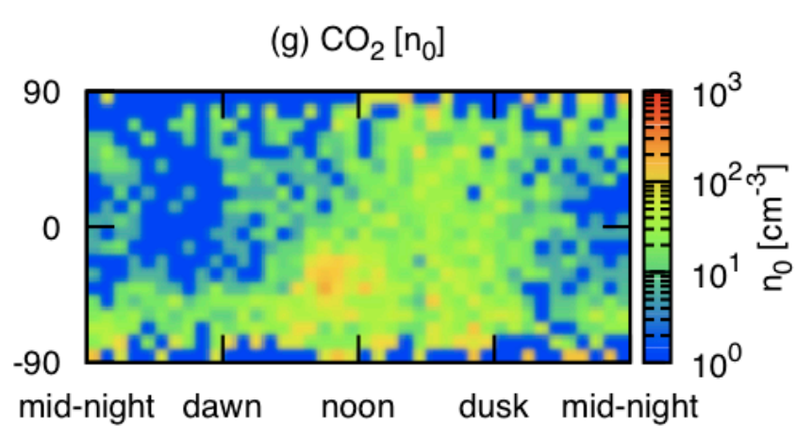
EUV (1026-15Å) at Mars = 5×10^{11} eV cm^{-2} s^{-1}

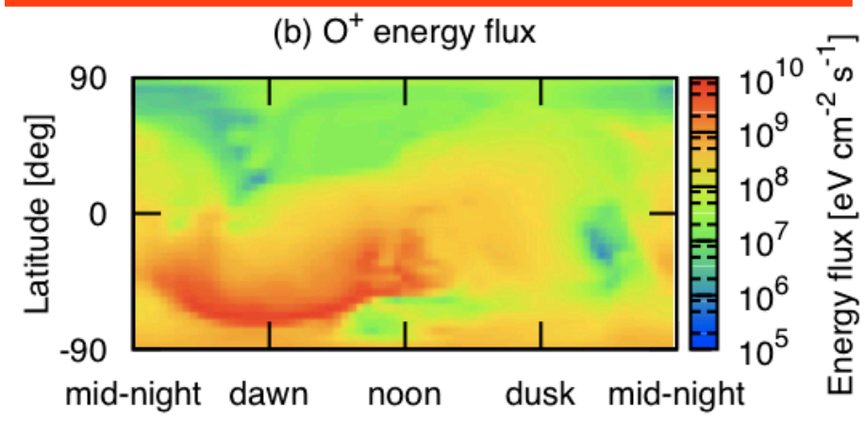
Cases	Precipitation rate	Avg. energy flux	Avg. incident angle
Quiet	1×10^{25} s^{-1}	4×10^{8} eV cm^{-2} s^{-1}	47 deg
Active	3×10^{25} s^{-1}	1×10^{9} eV cm^{-2} s^{-1}	50 deg
Extreme	9×10^{25} s^{-1}	3×10^{10} eV cm^{-2} s^{-1}	50 deg
noonC	6×10^{24} s^{-1}	7×10^{7} eV cm^{-2} s^{-1}	48 deg
dawnC	7×10^{24} s^{-1}	1×10^{8} eV cm^{-2} s^{-1}	46 deg
NoC	4×10^{24} s^{-1}	9×10^{7} eV cm^{-2} s^{-1}	53 deg

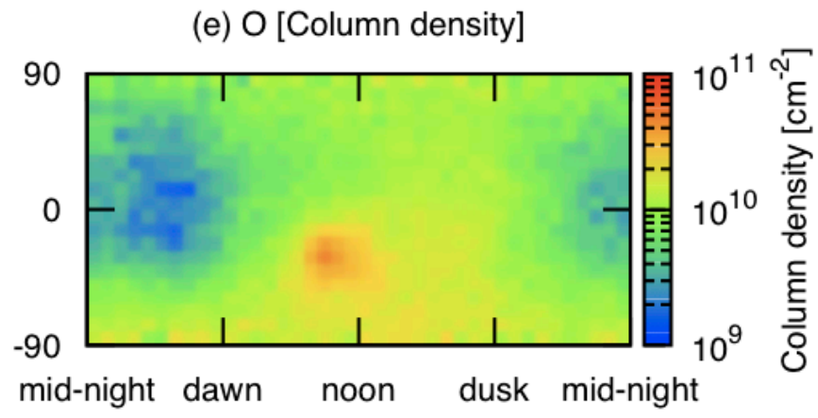
Sputtering responses [Quiet case]

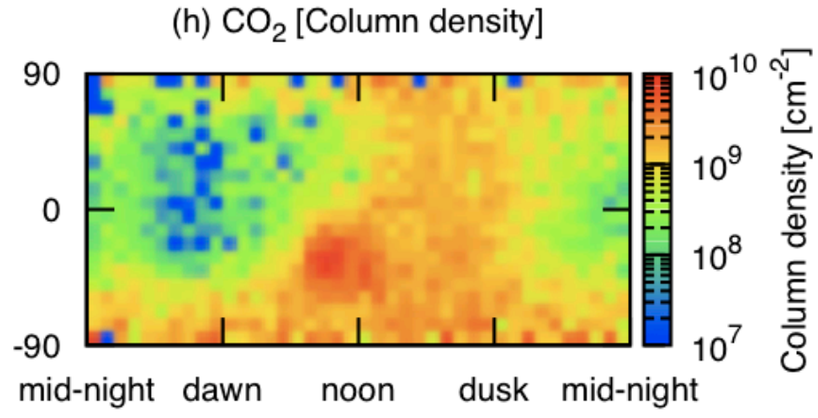


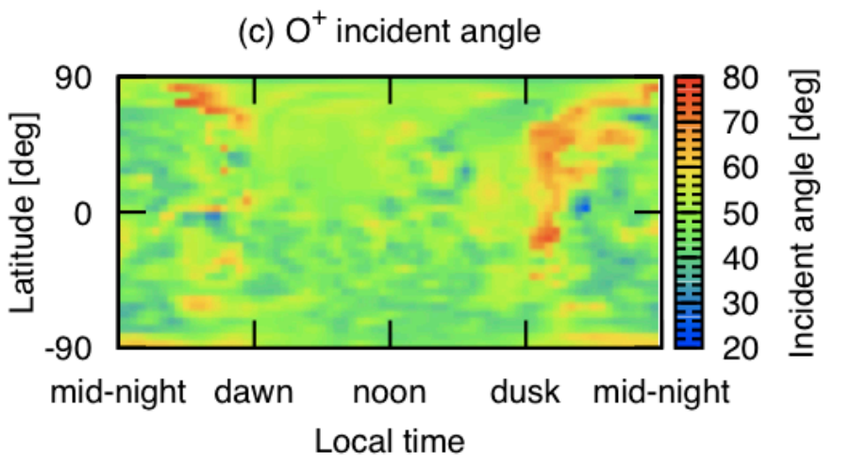


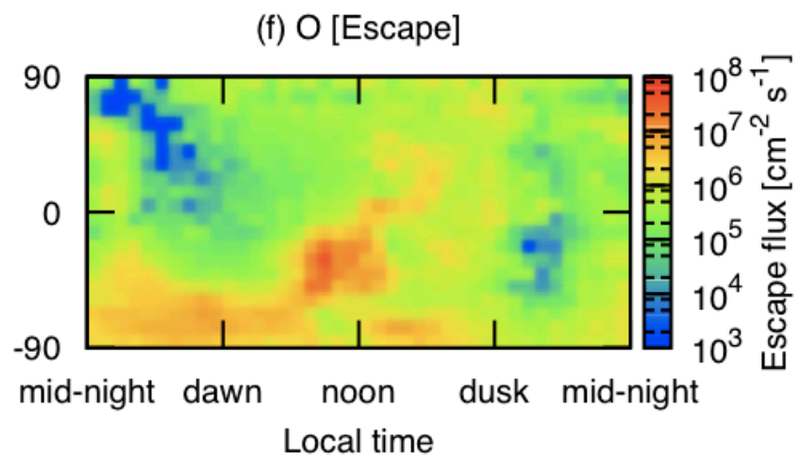


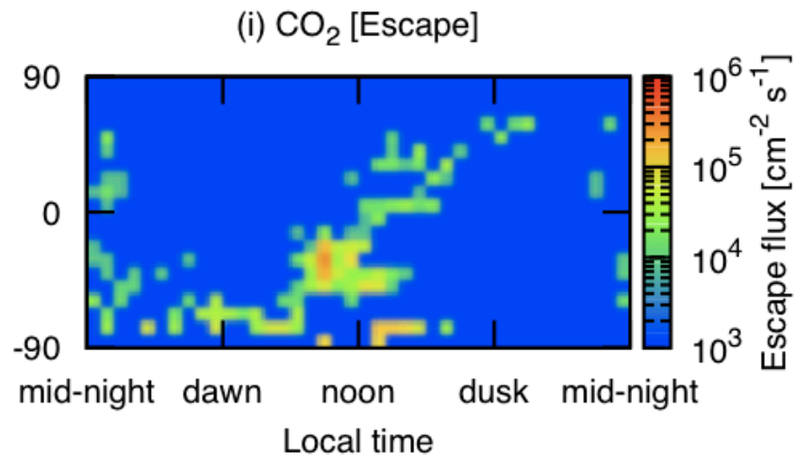




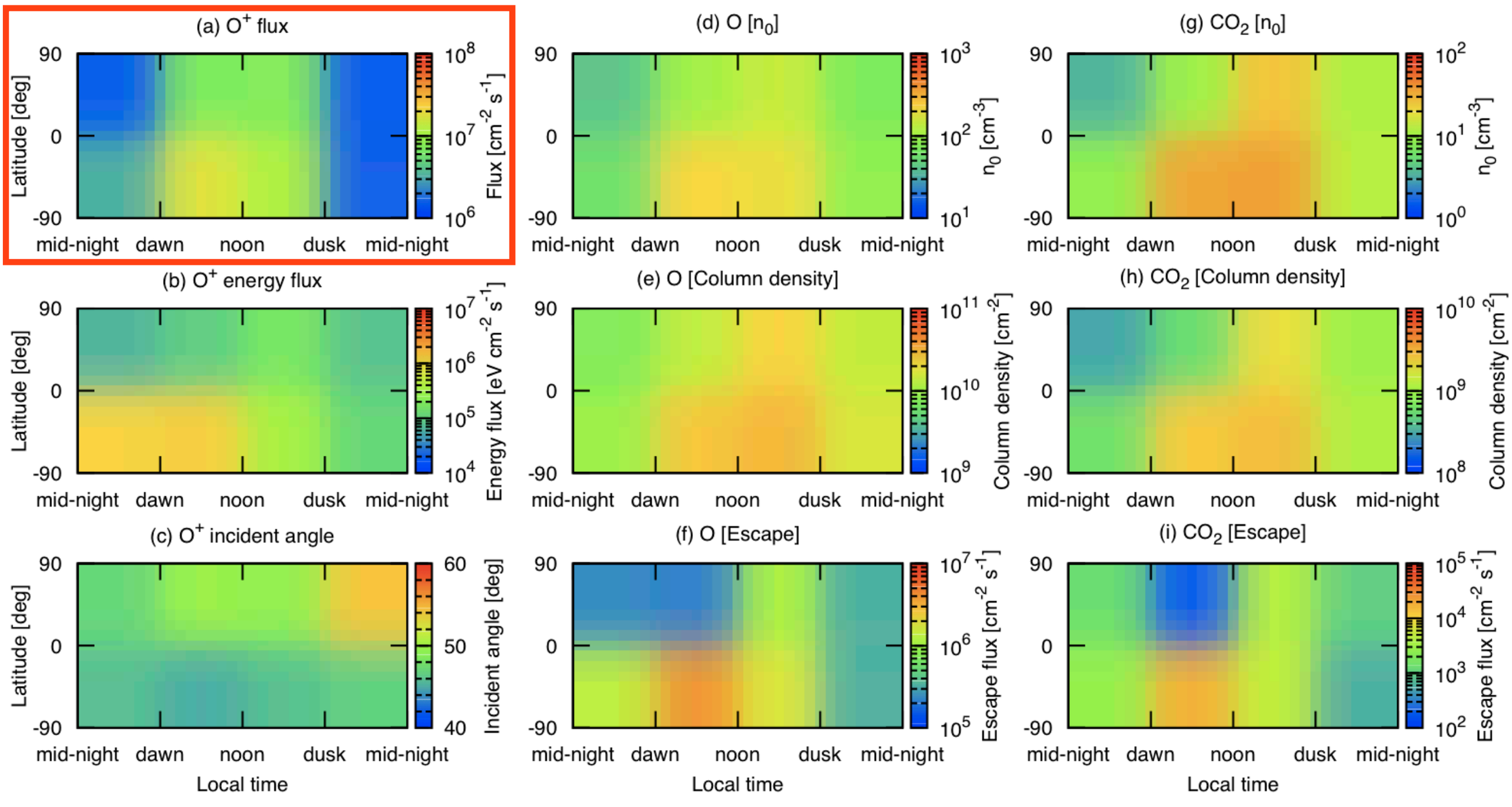




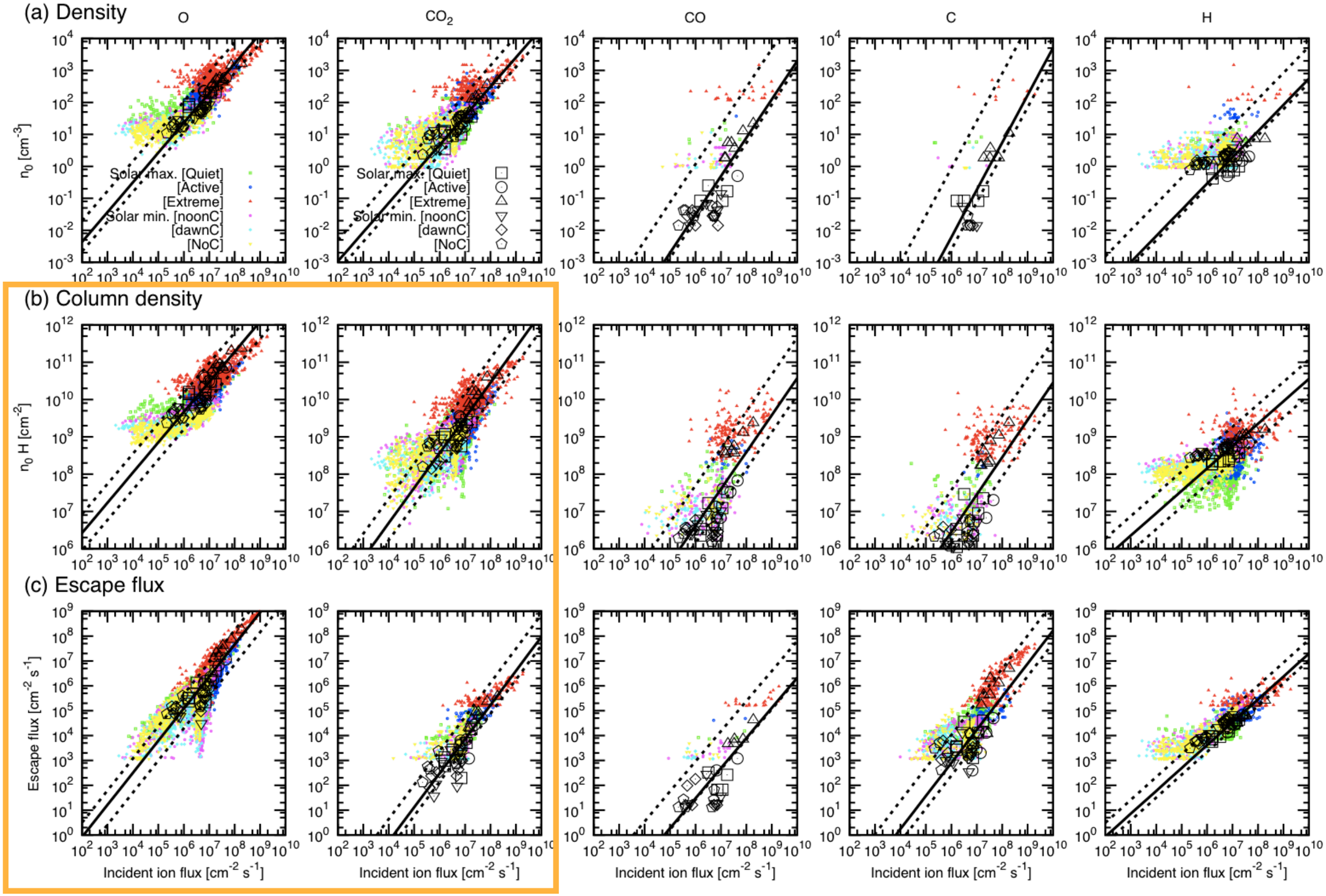




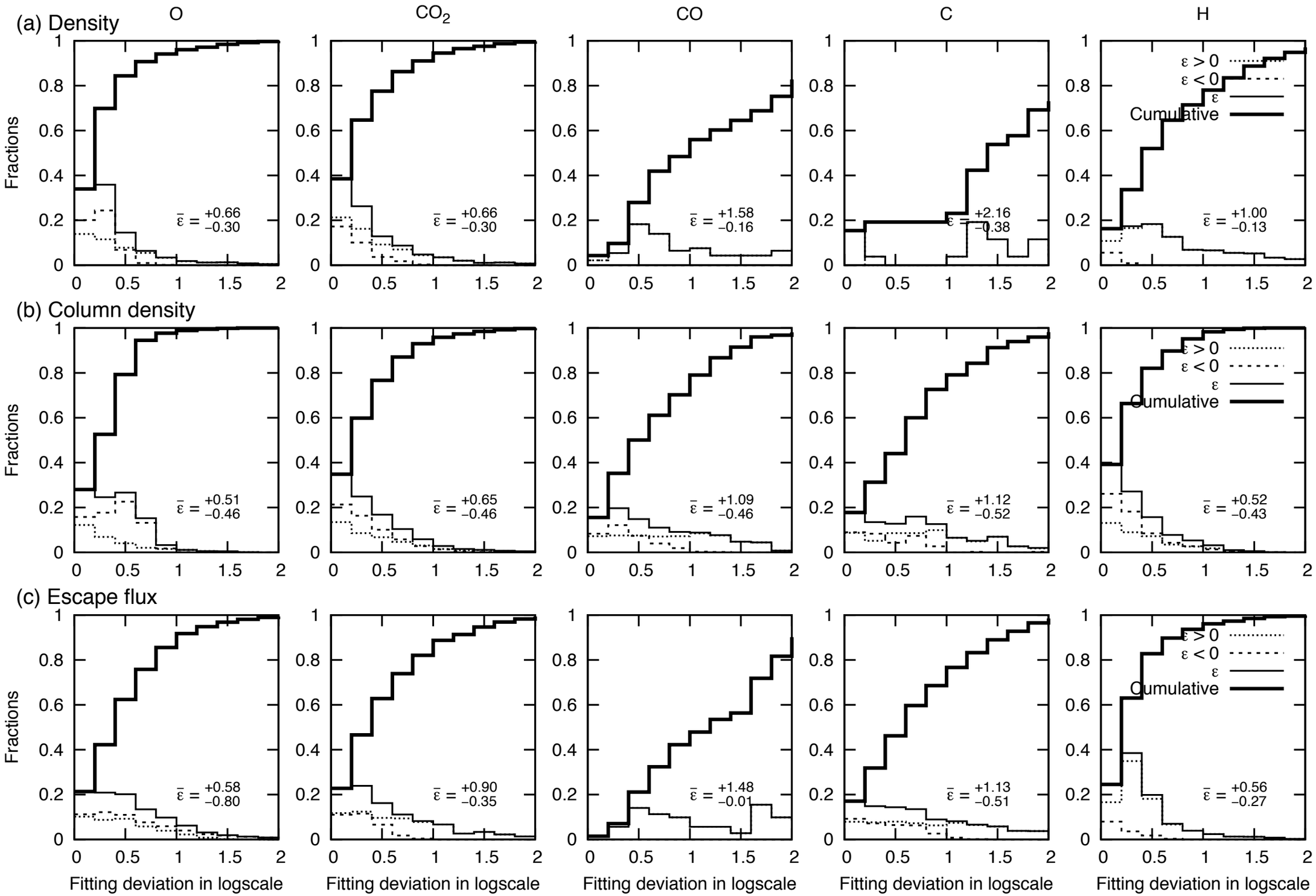
Averages [Quiet case]



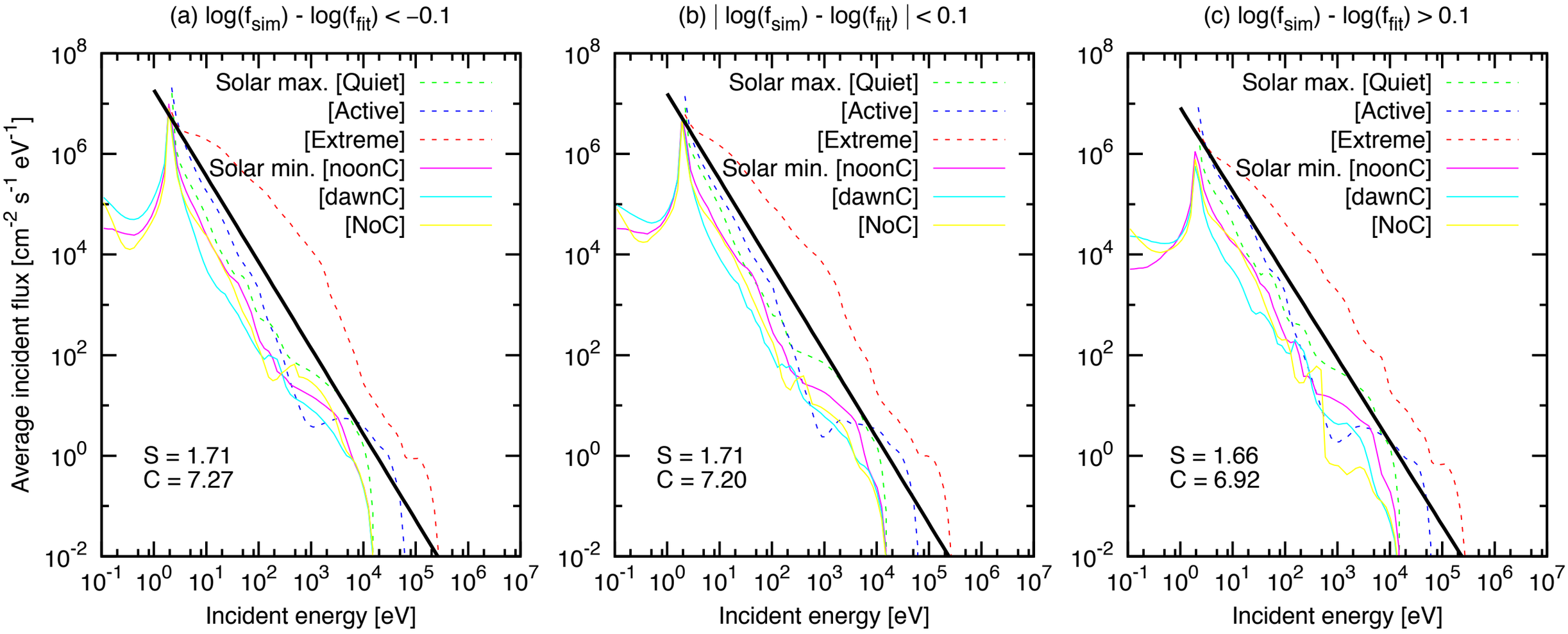
Response fitting



Fitting deviations



Spectrum types



$$\log(df_e) = C - S\log(E)$$

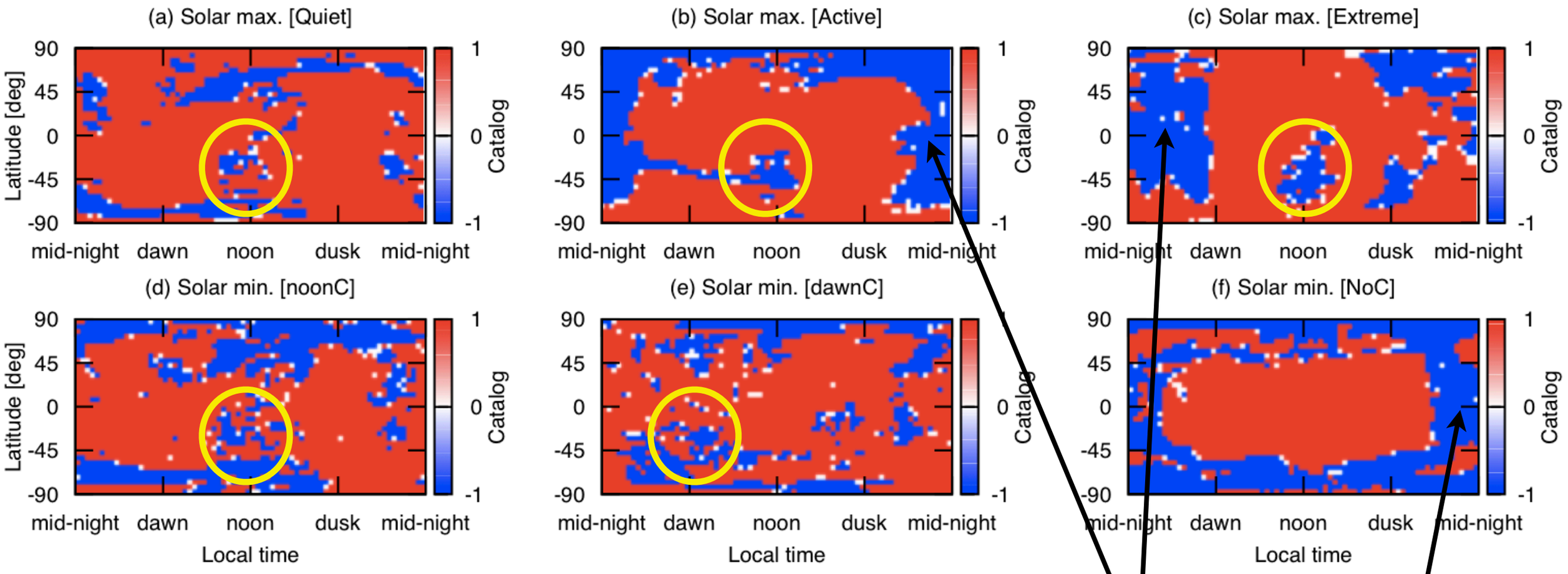
⇒ Catalogue spectra into 3 types:

(-1) S > 1.71

(0) 1.71 > S > 1.66

(1) S < 1.66

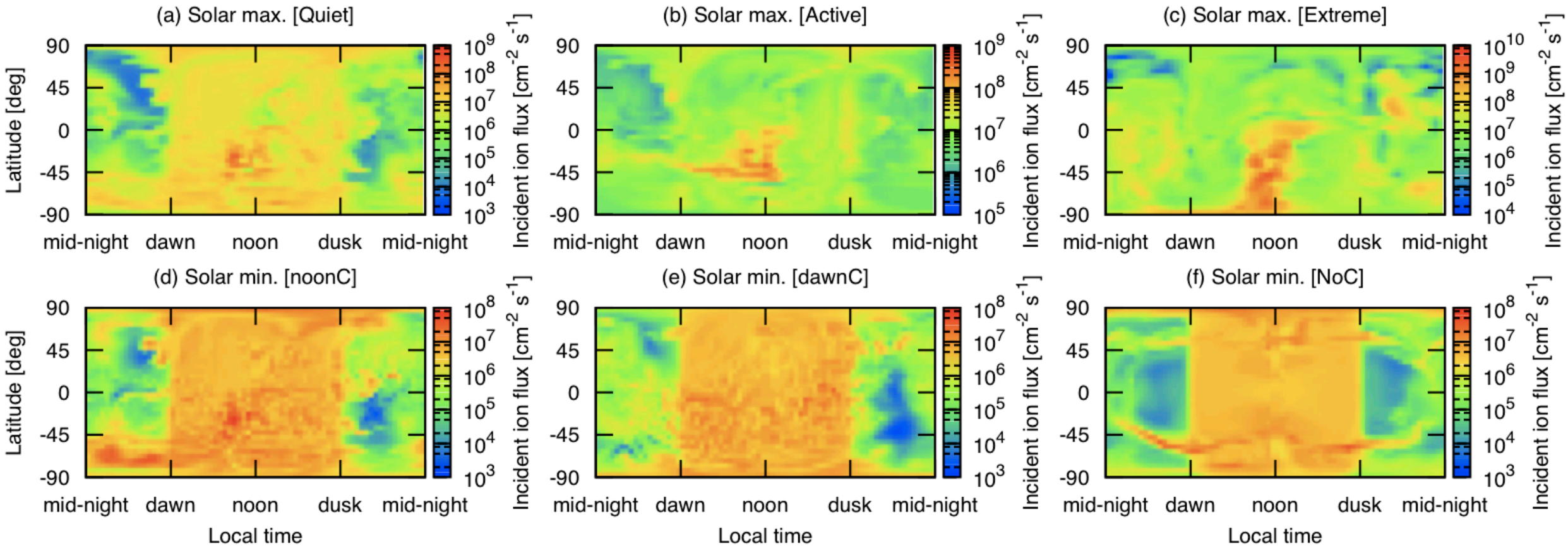
Spectrum catalog



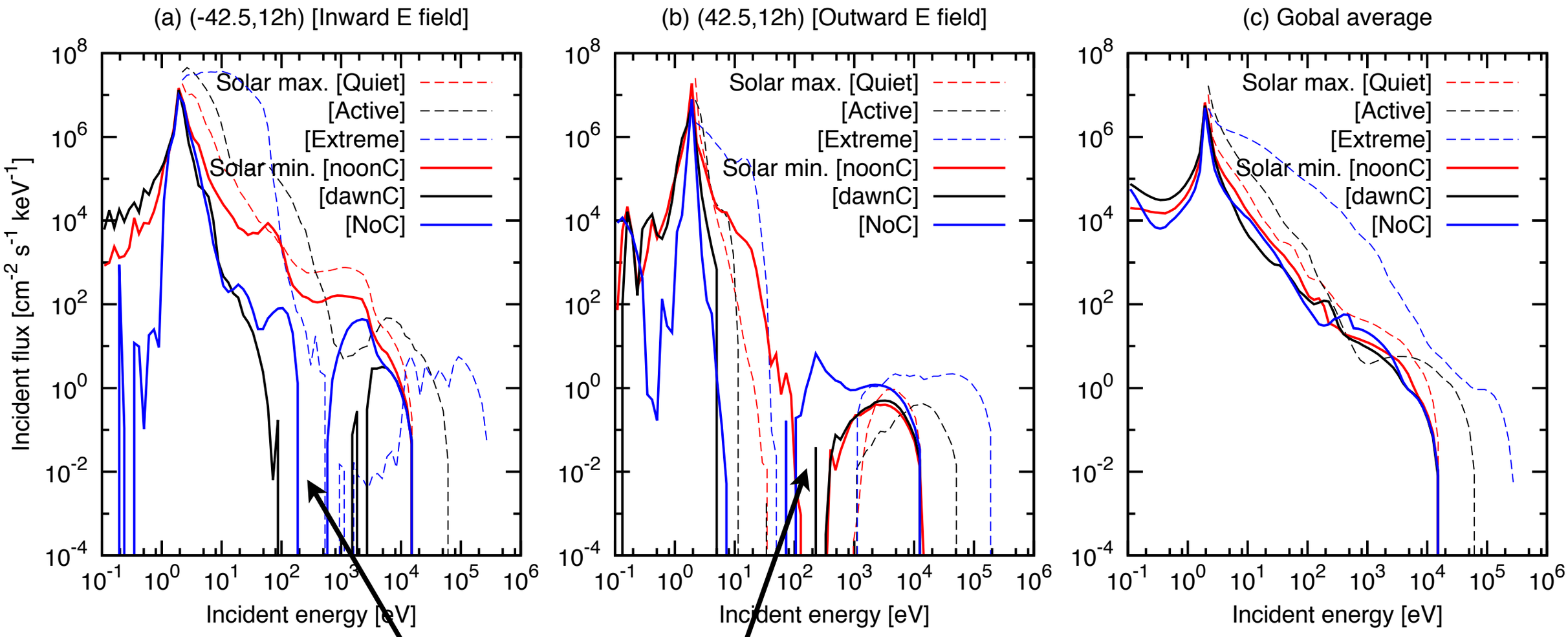
Larger ion fluxes with lower energies at strong crustal field regions.

Shorter pick-up ion recycling tail in the night-side.

Precipitation flux distribution



Spectrum fitting



"Forbidden regions" in the spectra due to separate treatment of the plasma flow and the motion of the pick-up ions from test particles in MHD model.
⇒ Uncertainties occur in the spectrum fitting when exclude those "forbidden regions".