



DWG-1: High atmosphere and chemistry

Björn Grieger
grieger@mps.mpg.de



François Leblanc
francois.leblanc@aerov.jussieu.fr



Science cases: 1/3

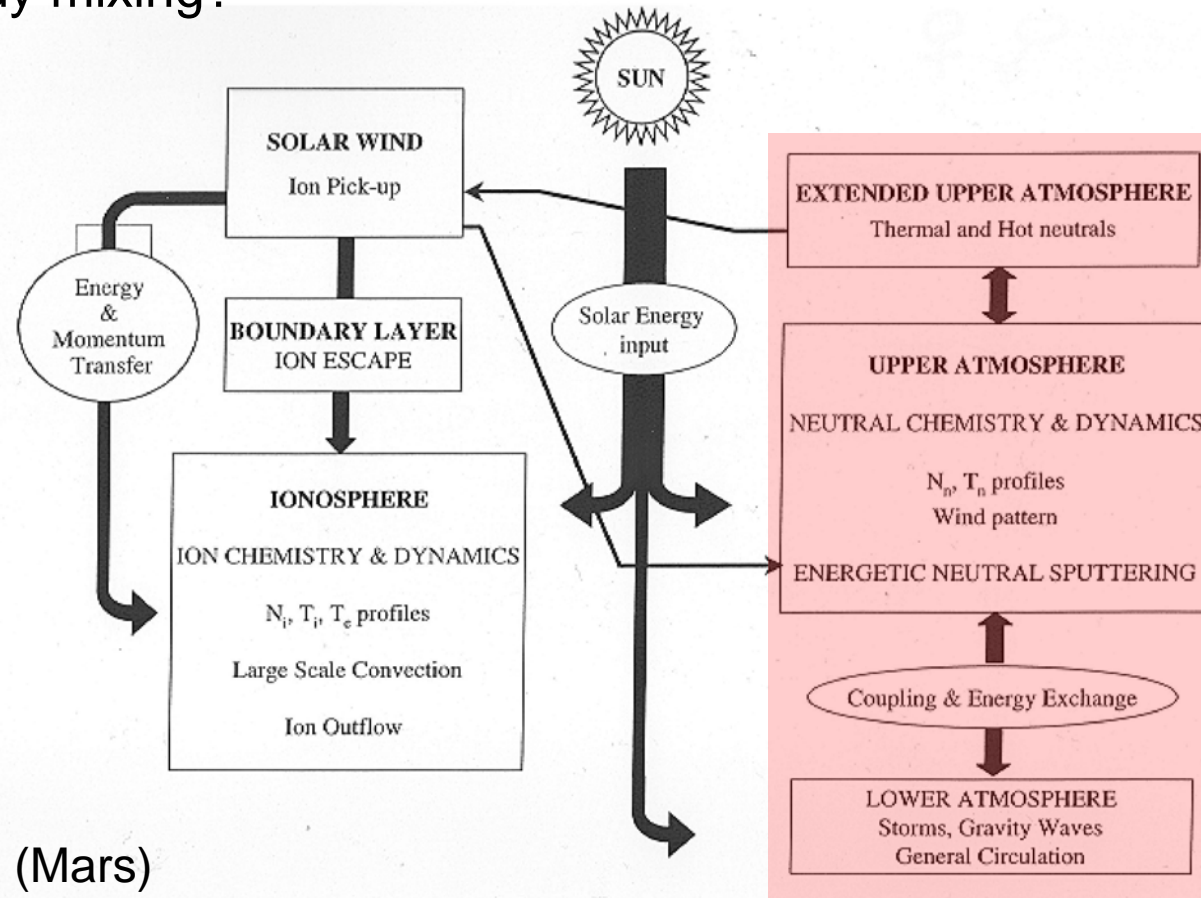
• Relation between general circulation and escape:

➤ How is the coupling between thermosphere and exosphere:
waves, diffusion, eddy mixing?

- ✓ Atmospheric vertical structures
- ✓ Dynamics and general circulation
- ✓ Role of escape on atmosphere

➤ Are the atmospheres of Titan and Mars static or in a permanent cycle of atmospheric escape/outgassing?

- ✓ Sources and sinks of H_2O (Mars)
- ✓ Sources and sinks of H_2 and N_2 (Titan)



From Bougher et al. 2002

Science cases: 2/3

• Solar wind penetration into the ionosphere :

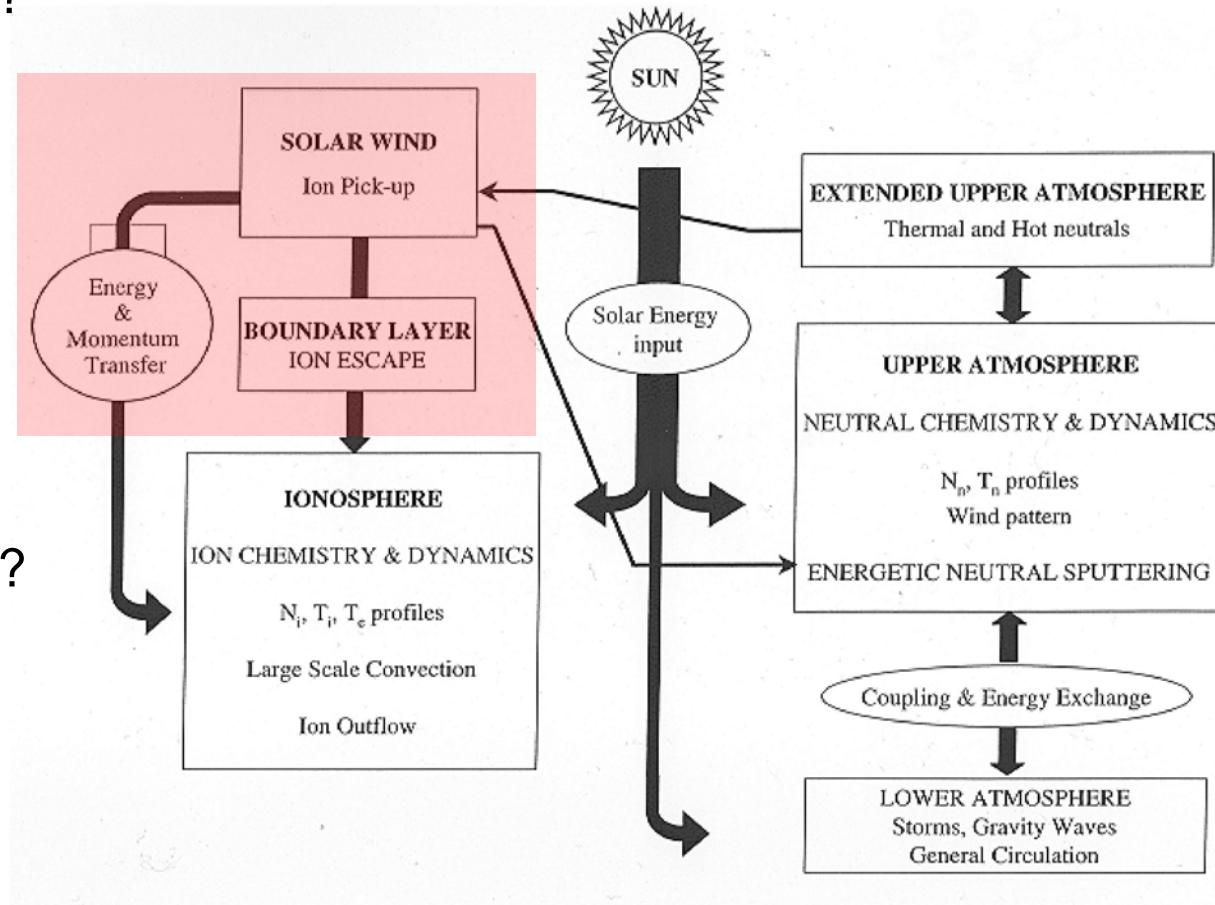
➤ How is the ionospheric escape driven by the solar wind or magnetospheric plasma?

✓ Influence of ionospheric structure on escape

✓ Influence of internal fields on escape

➤ Role of exosphere on the interaction with the incident plasma?
Feedback processes?

✓ Exobase densities and compositions



Science cases: 3/3

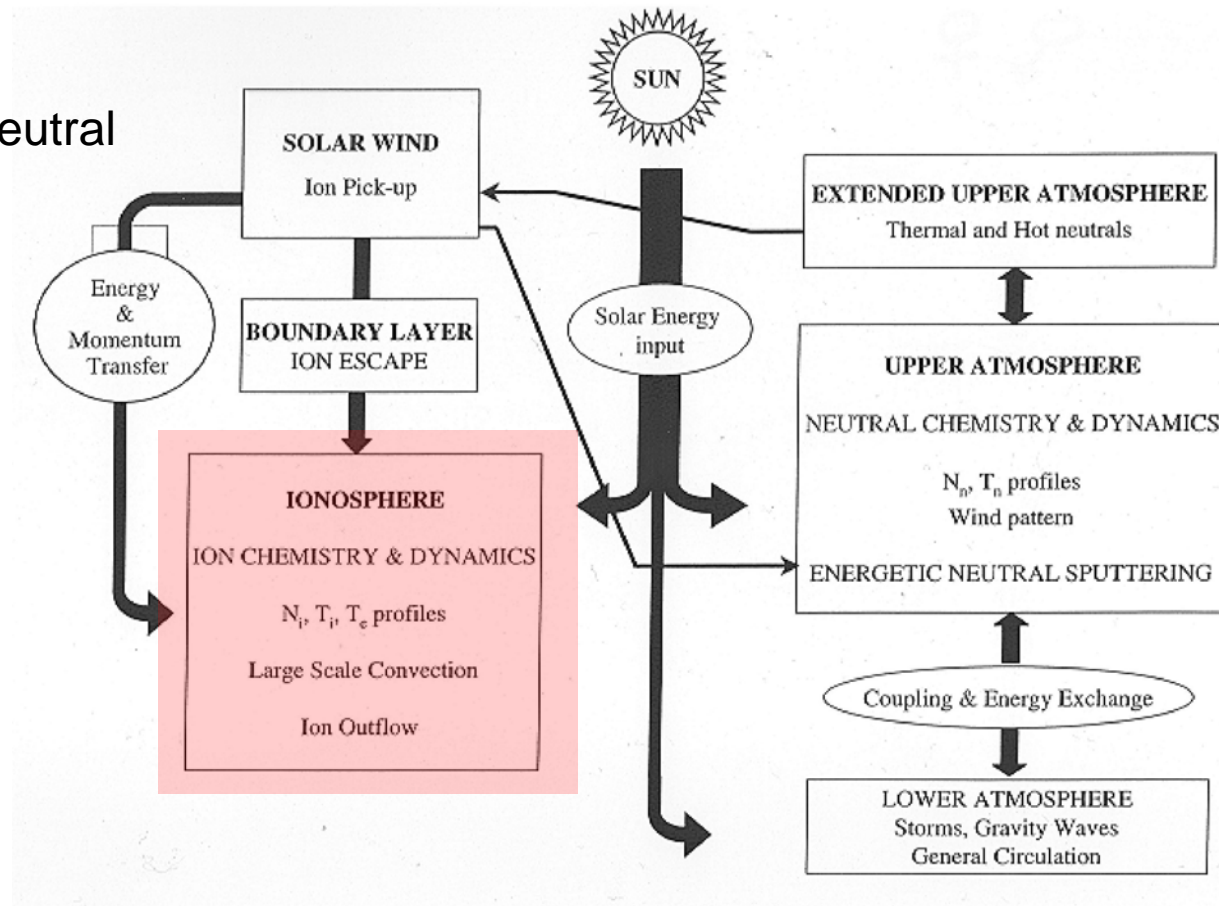
• What ion-neutral chemistry?

➤ How to describe the ion-neutral chemistry (in particular at Titan): what drives the chemistry?

- ✓ Life cycle of Titan tholin
- ✓ Main drivers of the ion-neutral chemistry
- ✓ Evolution of atmospheres

➤ What measurements and studies shall be done?

- ✓ Titan workshop
(Orsay 3rd October 2005)



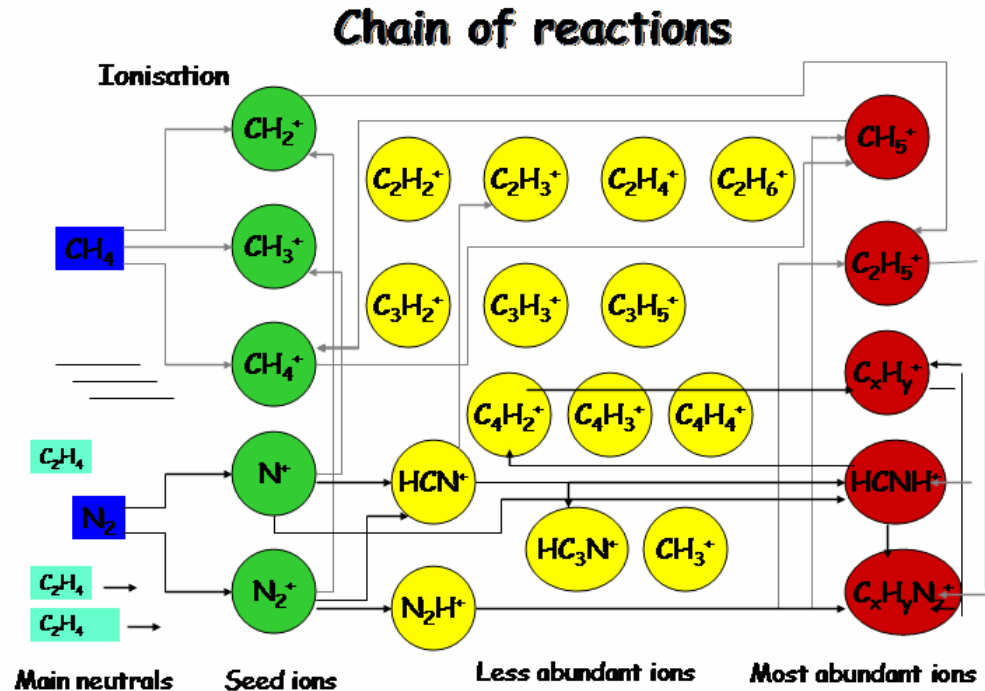
Science cases: 1/2

• Characterization of the exospheric, ionospheric and atmospheric density and composition during a whole solar cycle: how to do so?

➤ Instruments dedicated to measurement of these environments: description, where to find data and expertise

➤ Laboratory measurements of the main ion-neutral reactions (where to find them, who can be contacted to get information...)

⇒ Collaboration between laboratory experimentors and planetologists



Simplified Titan chemistry (Banaskiewicz 2005)

Science cases: 1/2

Information on:

- Measurements done by space or Earth instruments :
 - Databases and related useful links
 - List of identified specialists and laboratories

- Measurements from laboratory experiments:
 - Databases and related useful links (reaction rates, cross sections, studies of sensitivity...)
 - List of identified specialists and laboratories

- Results of models:
 - Databases for 1D, 2D and 3D applications
 - Key questions to be solved (which parameters to be measured...)