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Bougher, and a cast of
thousands

Longitudinal structure in
the martian upper
atmosphere as
discovered by MGS

Journal Club
14 September 1999

Mariner 6/7/9: UV spectrometer,
radio occultation

Mars 4/5: Lyman- α photometer,
VIS spectrometer

Mars 6: entry profile

Viking Orbiters: radio
occultations

Viking Landers: ion density, mass
spectrometer, entry profile

Phobos 2: UV/IR occultations,
ionospheric measurements

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UV spectrometer, radio occultation
- Mars 4/5:
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VIS spectrometer
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- Viking Orbiters:
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ion density, mass spectrometer,
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- Phobos 2:
UV/IR occultations,
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- Mars Pathfinder:
entry profile

Martian seasons: solar
distance and sub-
solar latitude

Latitude, longitude, and
local solar time

11 yr solar activity cycle

27 day solar rotation

Sporadic solar flares

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 - solar distance and sub-solar latitude
- Latitude, longitude, and local solar time
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- 27 day solar rotation
- Sporadic solar flares

Oct 97 - Mar 98: Phase 1
Perihelion, S spring
30'N - 60'N, 6pm
decreasing to 11am

Apr 98 - Sep 98: SPO
pretty pictures taken

Oct 98 - Jan 99: Phase 2
Aphelion, N spring
60'N - S Pole - 60'S,
5pm decreasing to
3pm then jump to
2am

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Going to talk about:
Variation in longitudinal
structure with lat, lst,
season, and on 2 week
timescale

NB - Zonal mean
predictions adequate,
systematic error present,
polar predictions
particularly poor

Conclusions

- Longitudinal structure => upper atm contains info about rest of atmosphere.
- Implications for better understanding of some geological processes as well as atmospheric ones.
- First measurements of intrinsic variability of upper atmosphere.