

Maps of Mars'
South Polar Cap:
2003-2005

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Overview

- Introduction
- Motivation
- Method
- Results
- Future

MARS

MAY 11th 2005

Ls 209

Dia 7,1"

De -23,9

IR 780+ nm



125°

04 H 22 UT

Blue-Violet



122°

04 H 10 UT

S 5 / 10 T 6-7 / 10

Altitude 18-20°

Mewlon 210 F/46 + ATK-1HS

Christophe Pellier



Abbreviations

- SPR = South Polar Region
- SPC = South Polar Cap

Introduction

- No calendar for Mars
- Areocentric Longitude (L_s) is the calendar for Mars
- L_s ranges from 0° to 360°

L_s

L_s

Season

(Southern Hemisphere)

0 – 90°

fall

90-180°

winter

180-270°

spring

270-360°

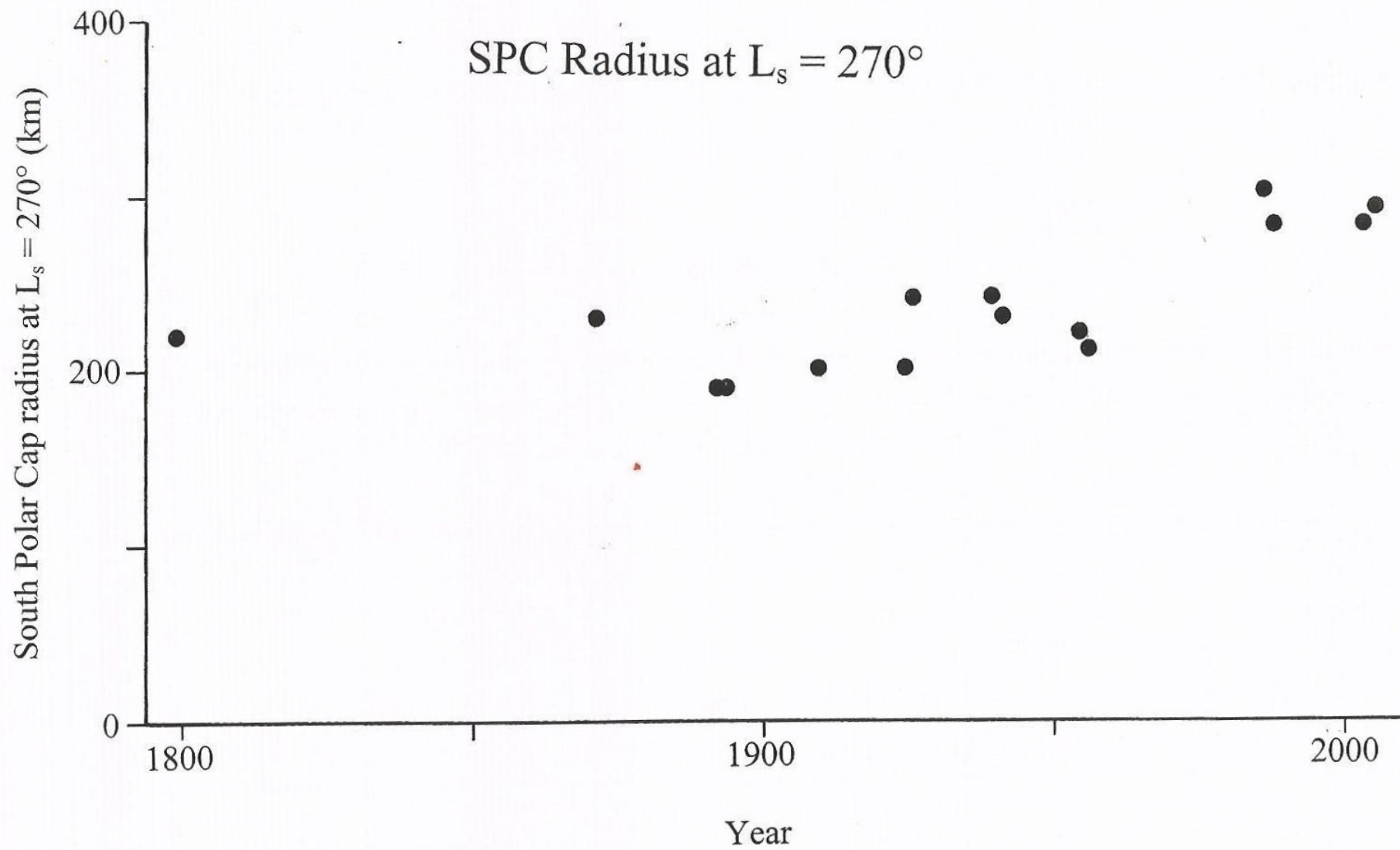
summer

Motivation

- Is the SPC getting bigger/smaller?
- Detecting dust storms near the SPC
- Change in the SPR

Big Problem

- After $L_s = 240^\circ$
 - SPC has irregular shape
 - SPC is not centered on the South Pole



Method

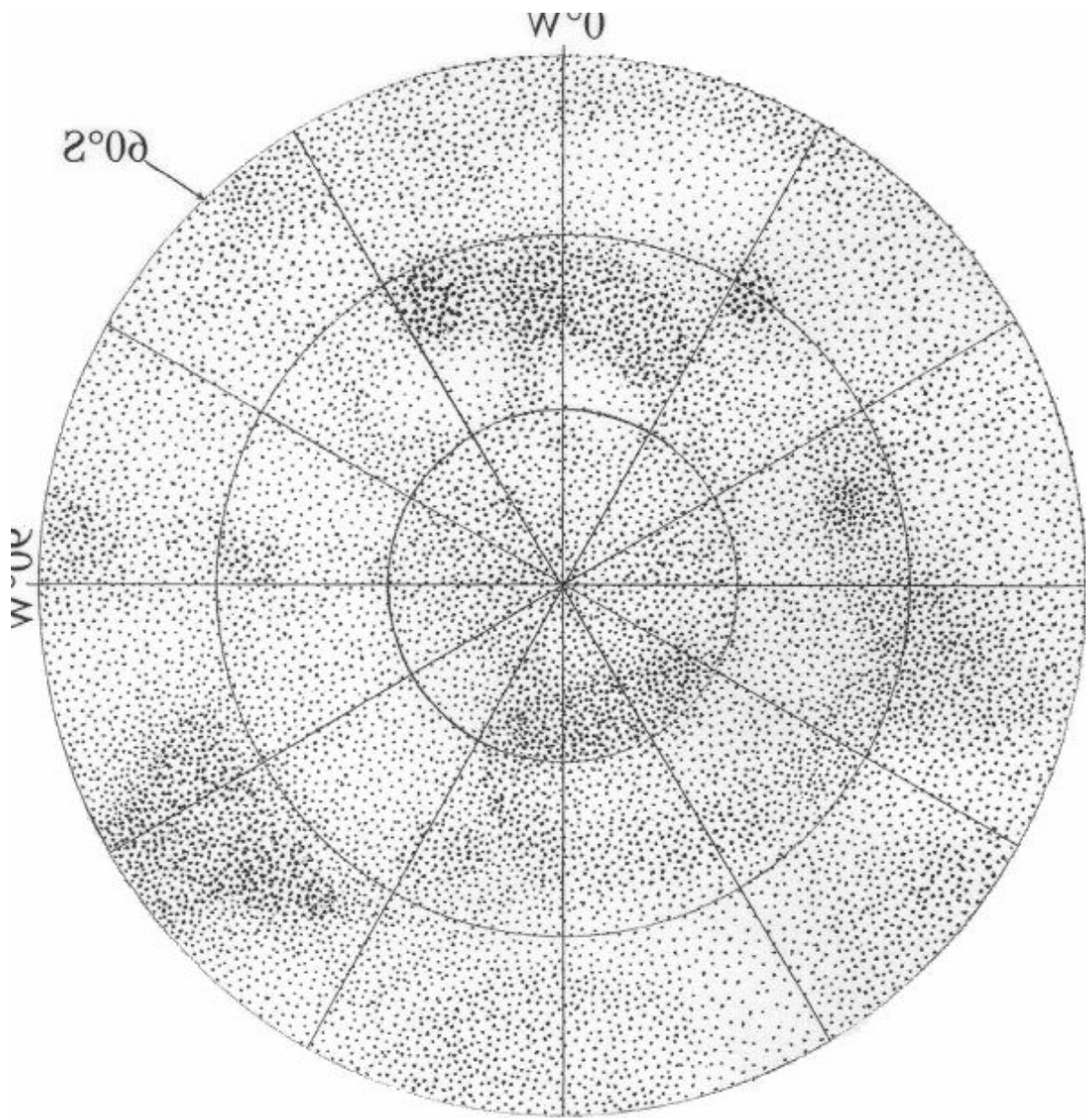
- Draw a map of the SPR when:
 - SPC is small
 - SPR it tilted to Earth
 - Mars is close
 - No South Polar Hood (clouds)

Method (Continued)

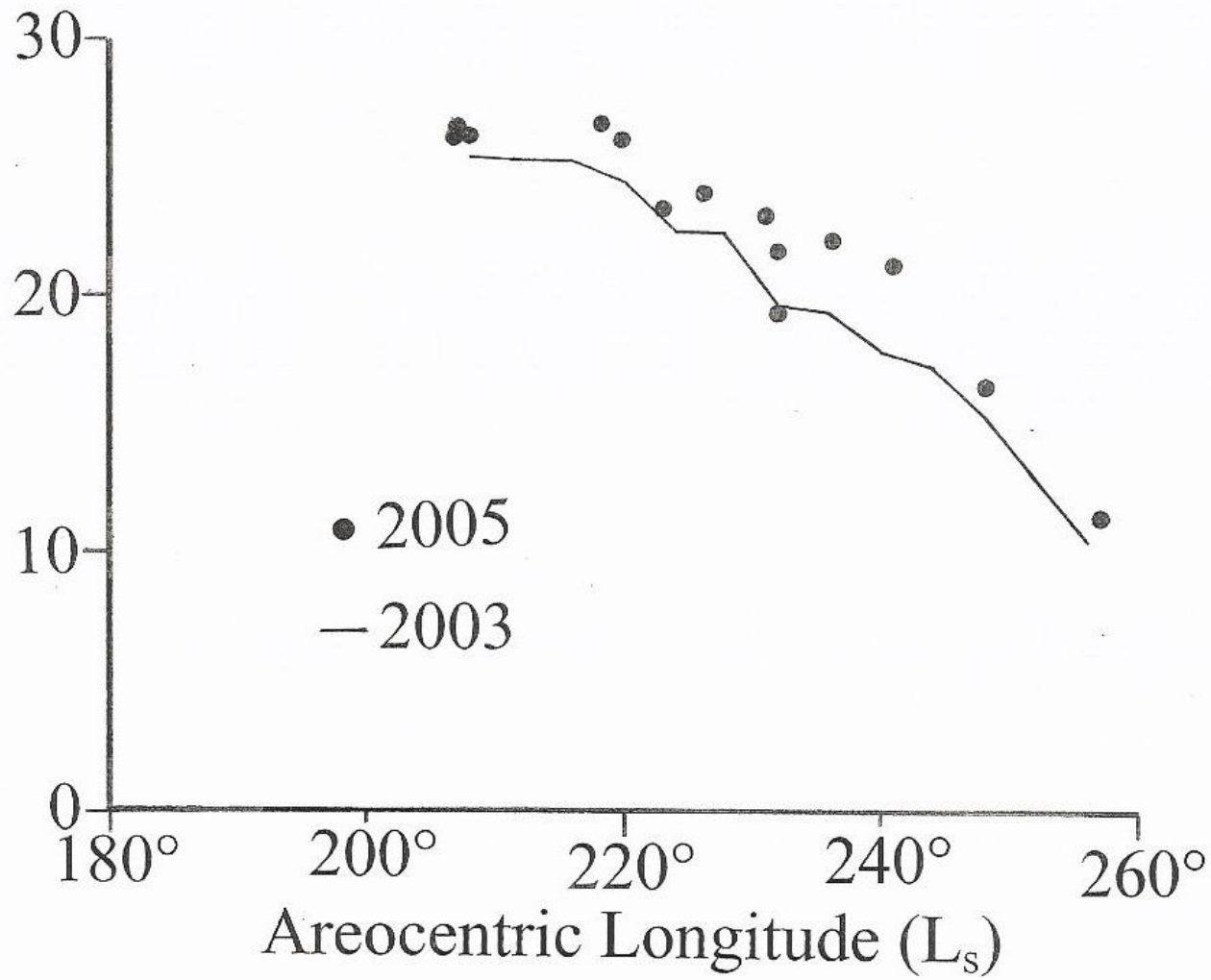
- Red filter images used
- 20-60 images ($270^\circ < L_s < 274^\circ$)
- Measure or do: (*all longitudes*)
 - North-South dimension
 - East-west dimension
 - Draw in fine detail
- Repeat process for ($274^\circ < L_s < 278^\circ$), etc.

Results

- 15 SPC maps ($270^\circ < L_s < 330^\circ$) for 2005
- 15 SPC images ($210^\circ < L_s < 270^\circ$) for 2003 (*see 2003 report*)



Radius of Mars' South Polar Cap
(in planetary degrees)



South Polar Cap

- A little larger than the 2003 cap during early and mid spring
- About the same size as the 2003 cap in mid to late spring.

Comparison with Drawings

- 180 drawings made in 2005 were studied
 - SPC was measured
 - Measurements compared to images at similar longitudes
- SPC in drawings was 0.23 or 14 km larger than in images

Future

- Compare the SPC size of different years to that in 2005.
- Pay close attention to the longitude and location of the SPC
- Pay attention to the L_s

Conclusions

- Map of SPR is complete
- Two new bright areas near the South Pole
- Maps of the SPC show how SPC shrunk in 2003 and 2005