Meteorology of SO cloud regimes

Workshop on Southern Ocean clouds & and meteorology

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Monash Weather and Climate

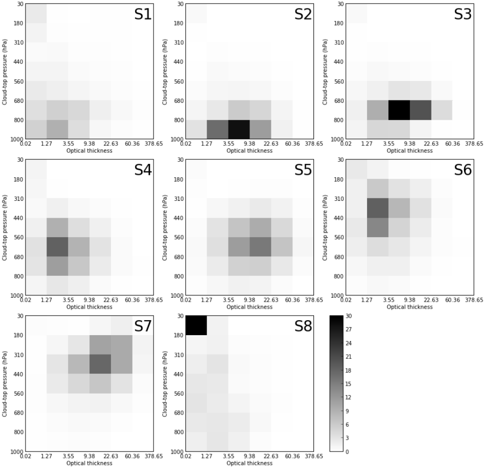
Nov 27 2012

Introduction

Characterising the meteorological context of the ISCCP cloud regimes.

- Looking at DJF: this is when TOA shortwave flux biases are greatest
- DJF is also best for ISCCP observations
- ERA-Interim data

ISCCP histograms



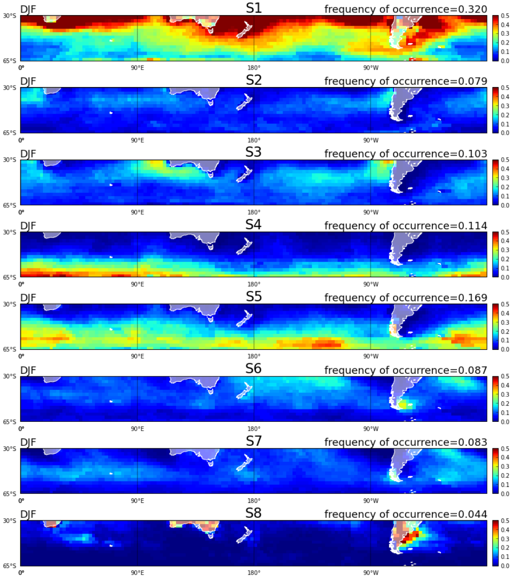
Sorted lowest to highest, thinnest to thickest:

- S1–S3: boundary layer clouds
- S4 & S5: mid-topped clouds
- S6 & S7: deep clouds
- S8: cirrus

Distribution and frequency

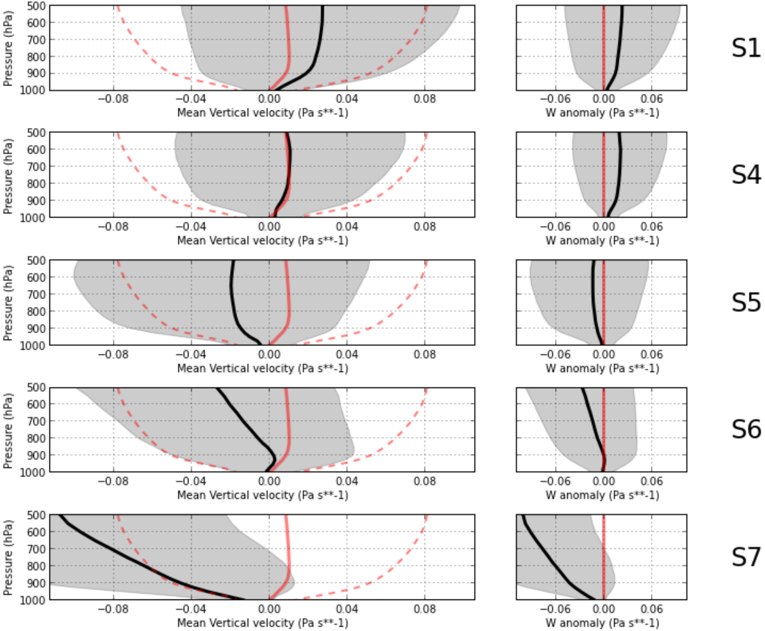
Selected regimes:

- S1: prevalent marine BL clouds,
- S4 & S5: high latitudes, associated with TOA SW flux bias
- S6 & S7: fronts and extratropical cyclones

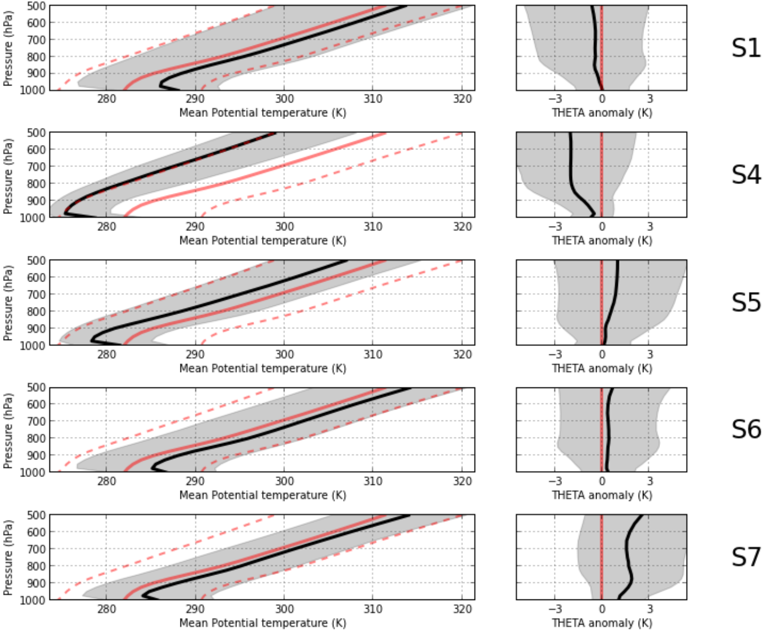


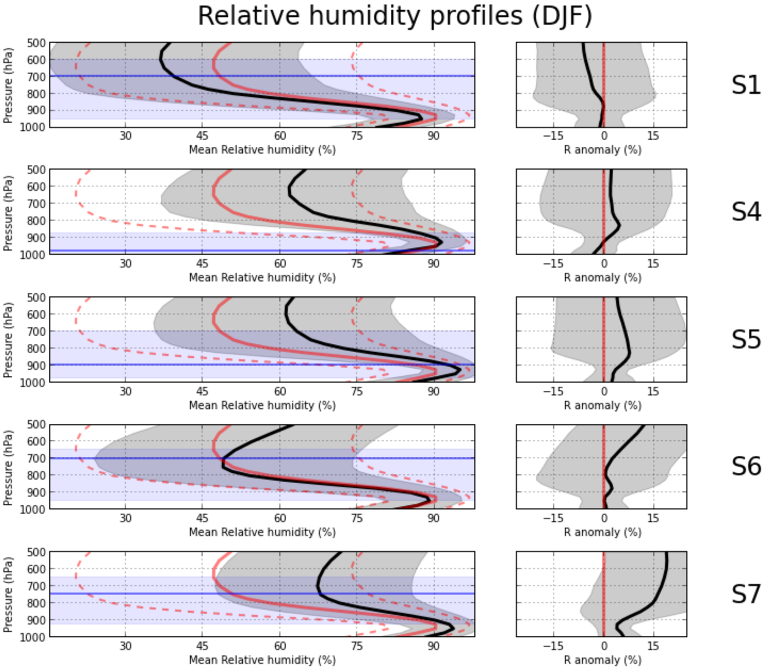
Outline

Vertical velocity profiles (DJF)



Potential temperature profiles (DJF)




Relative humidity profiles (DJF)
Pressure (hPa)
Mean Relative humidity (%)
R anomaly (%)
S1
S4
S5
S6
S7
500
600
700
800
900
1000
30
45
60
75
90
−15
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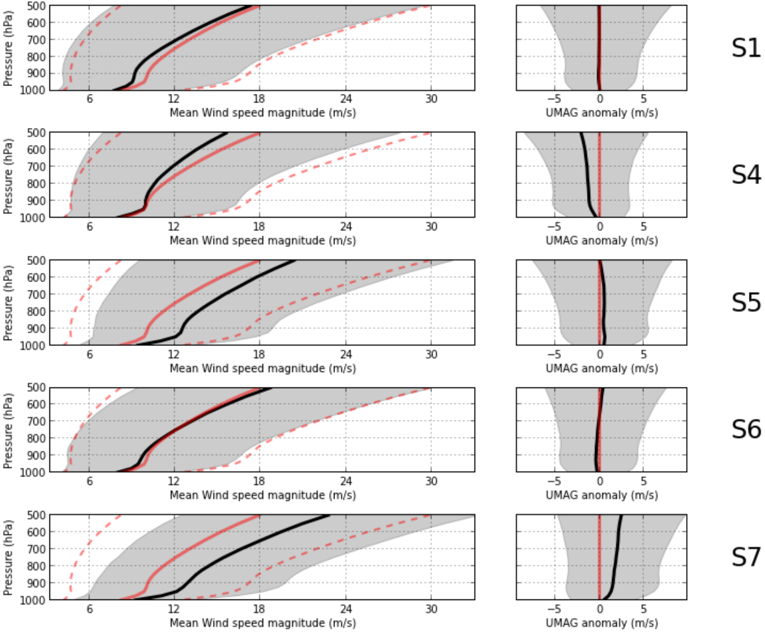
15

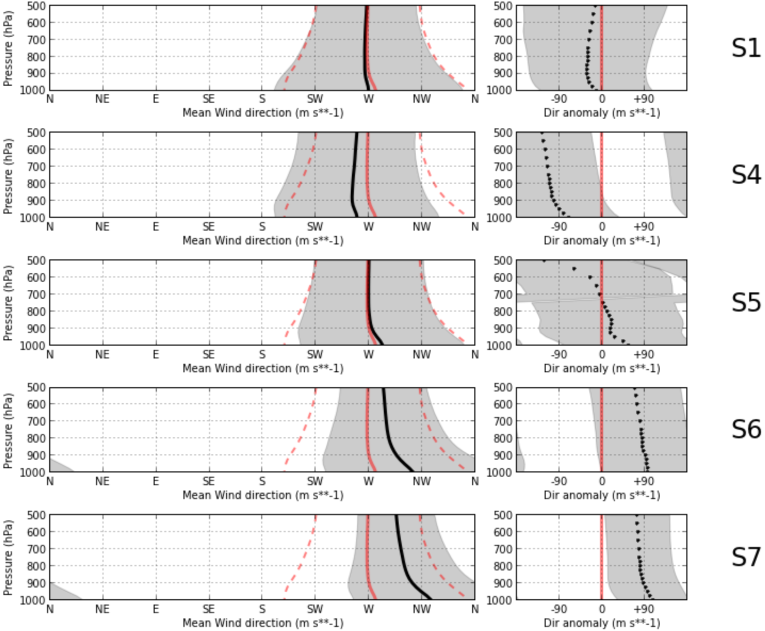
Meteorology of SO cloud regimes

S. Mason

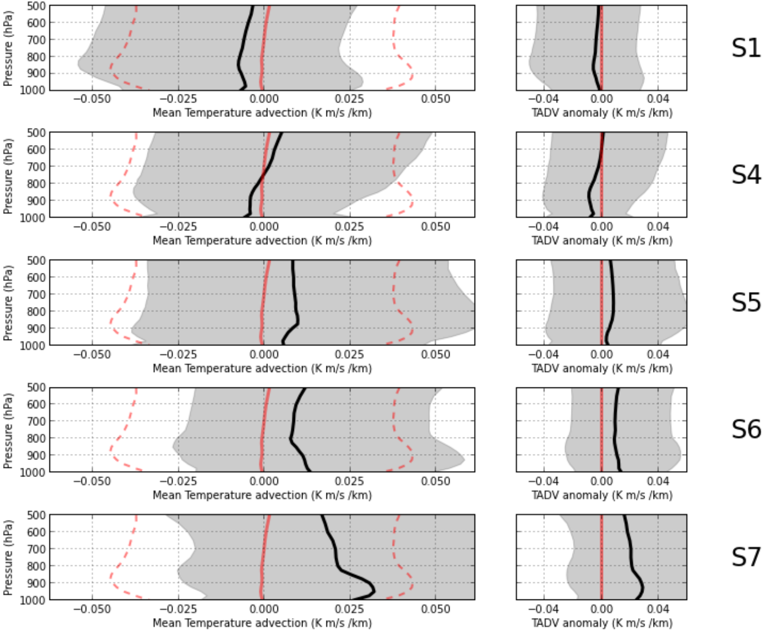
Wind speed magnitude profiles (DJF)



Wind direction profiles (DJF)



Temperature advection profiles (DJF)



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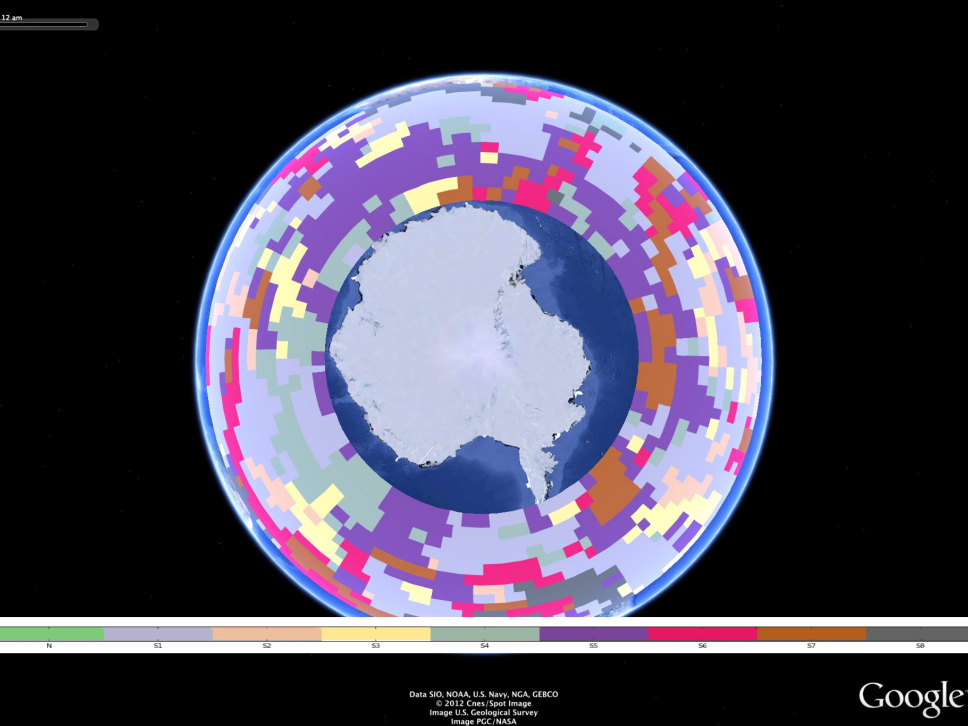
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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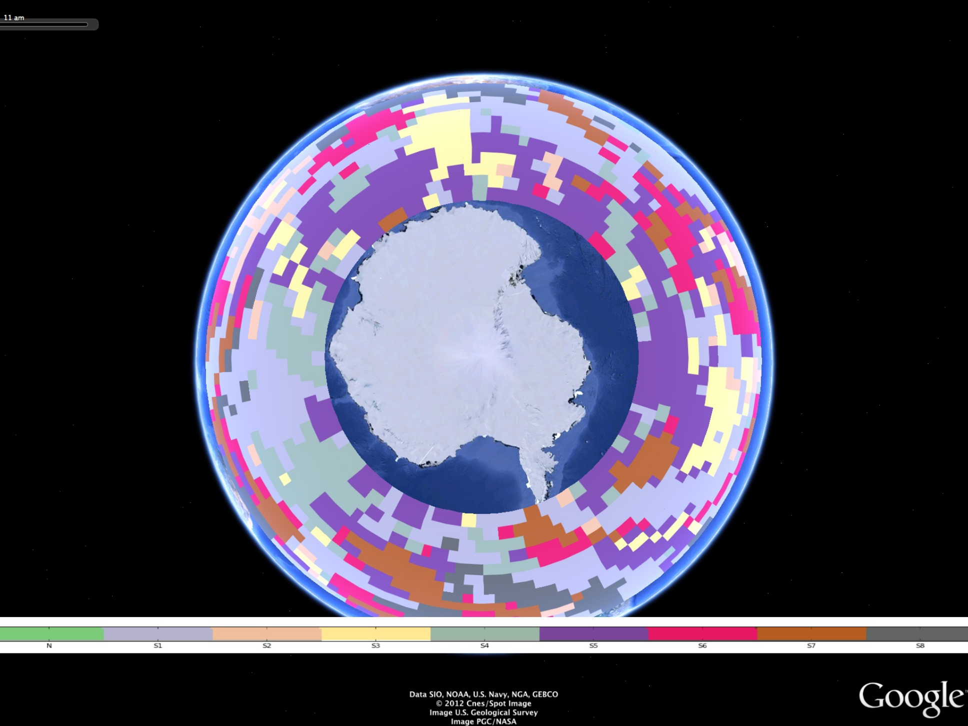
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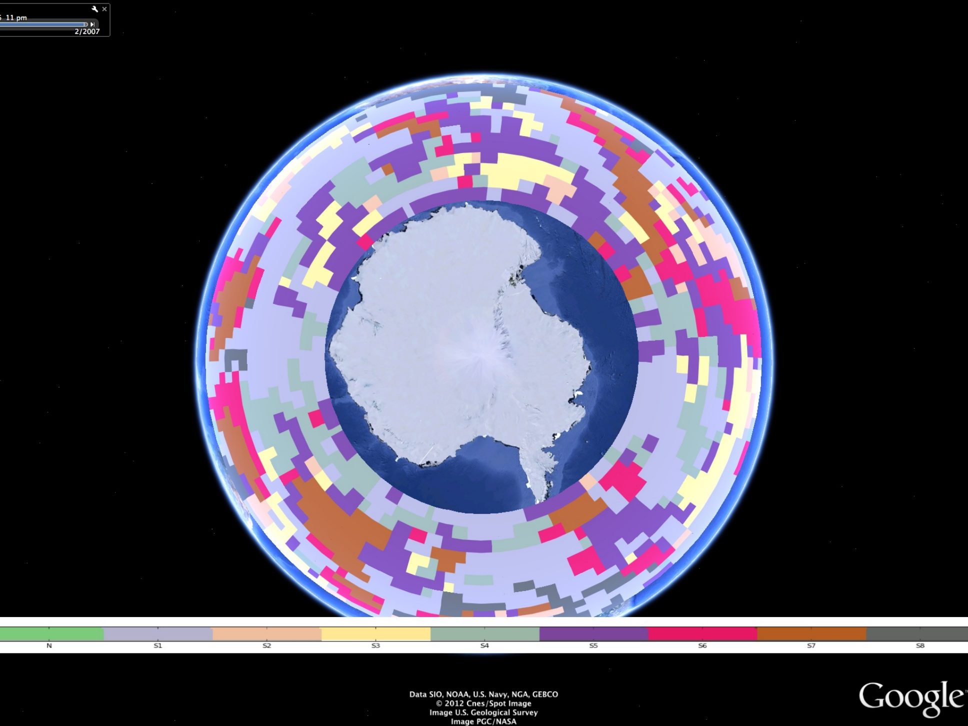

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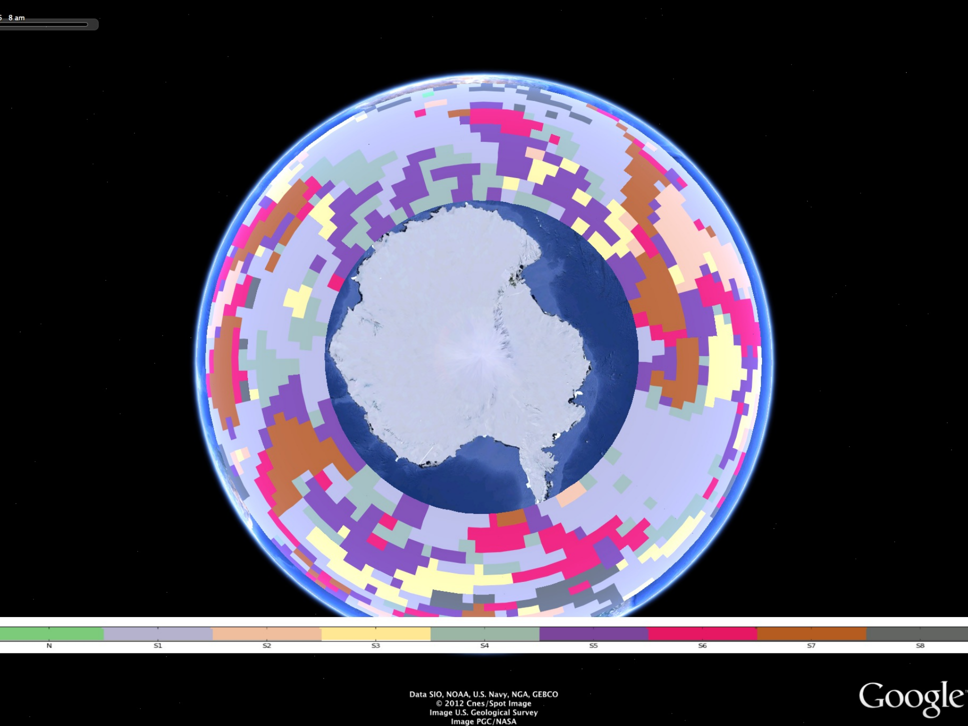
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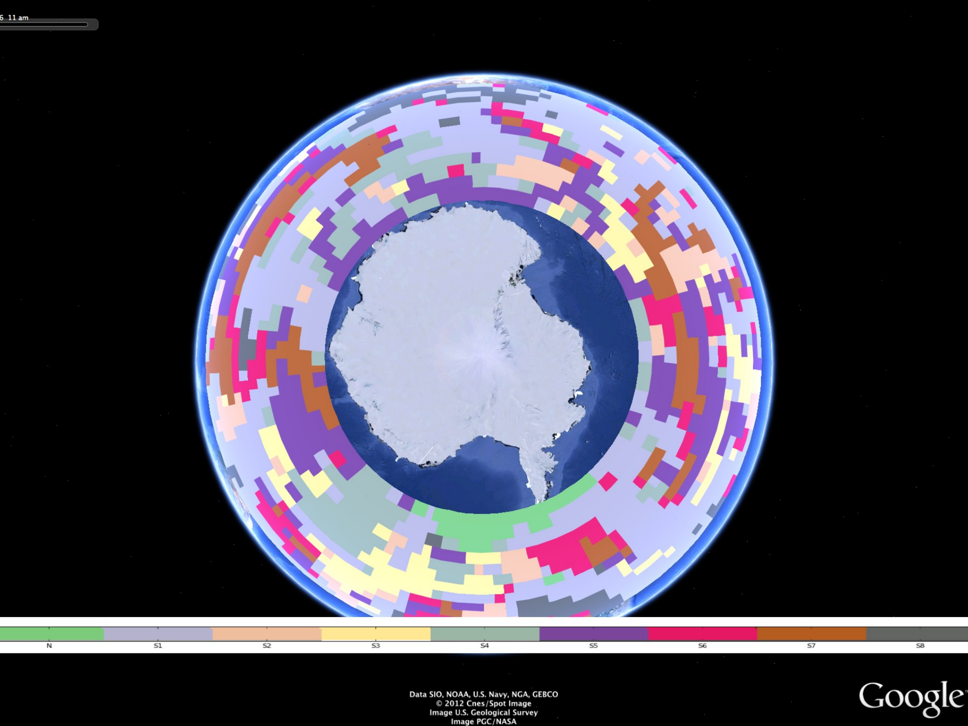
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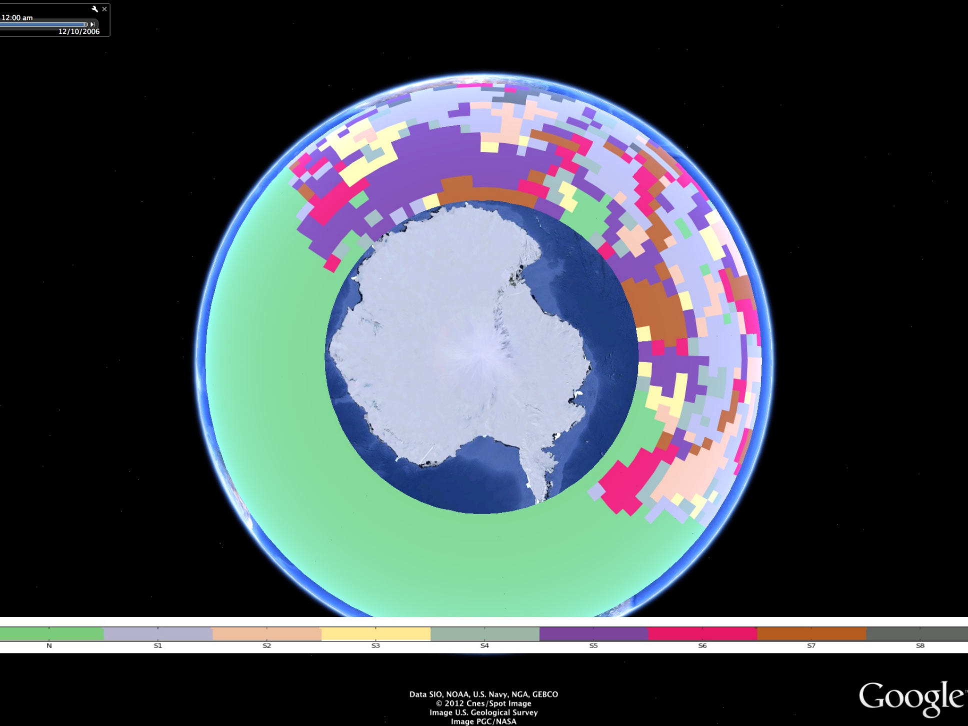
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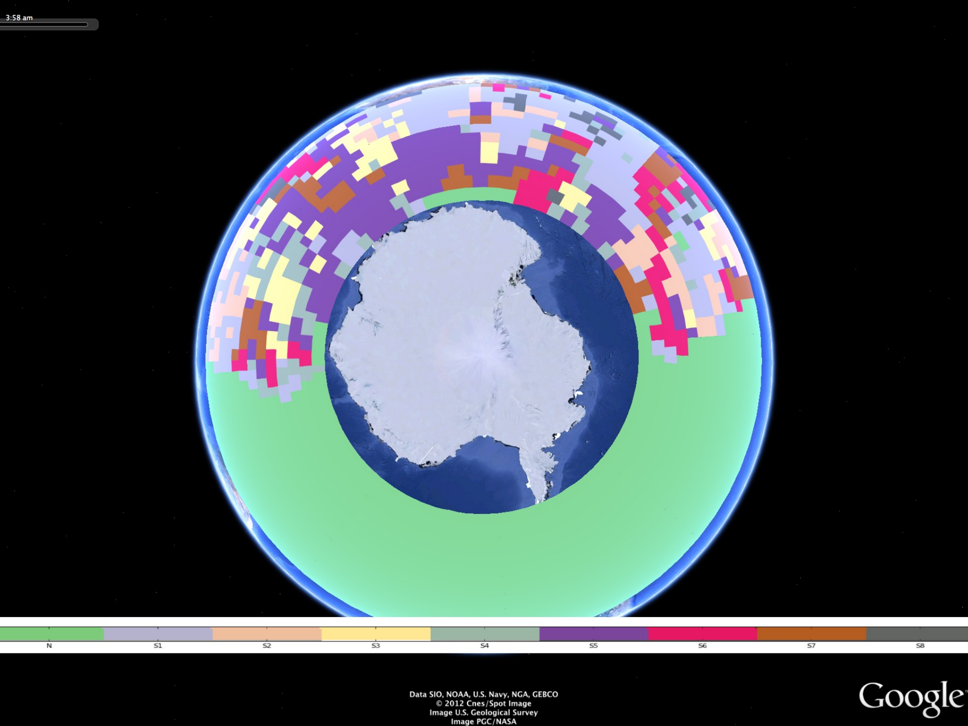
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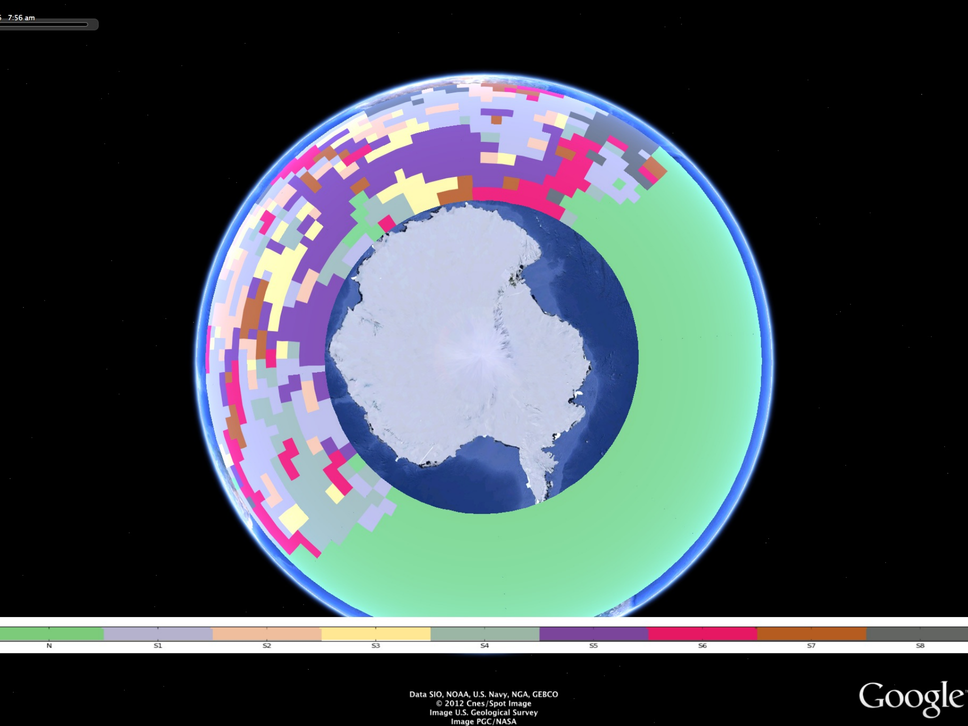
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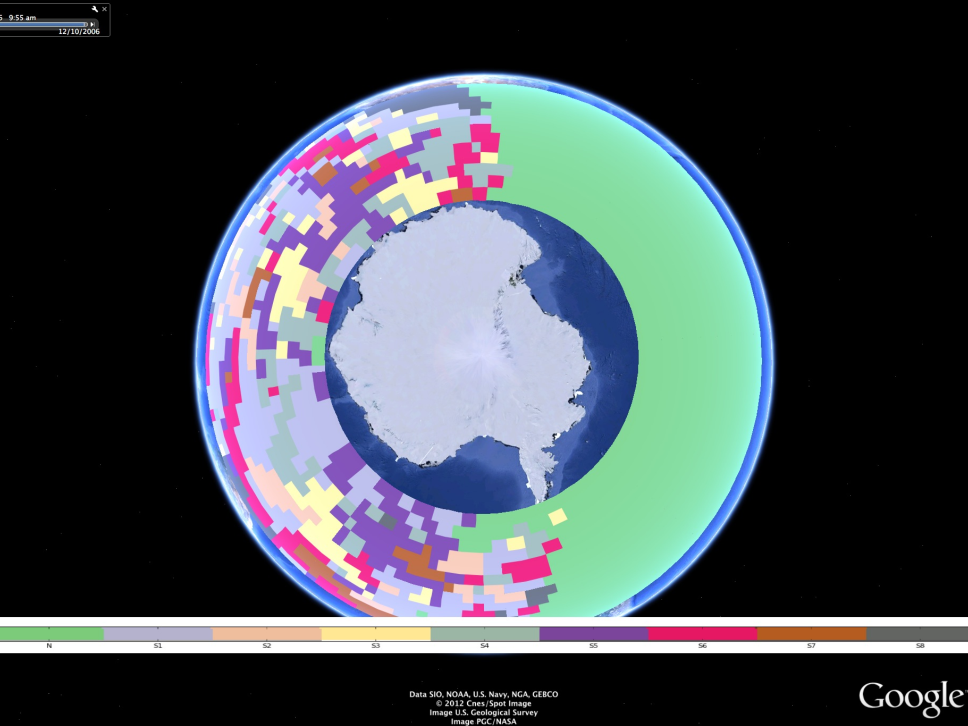
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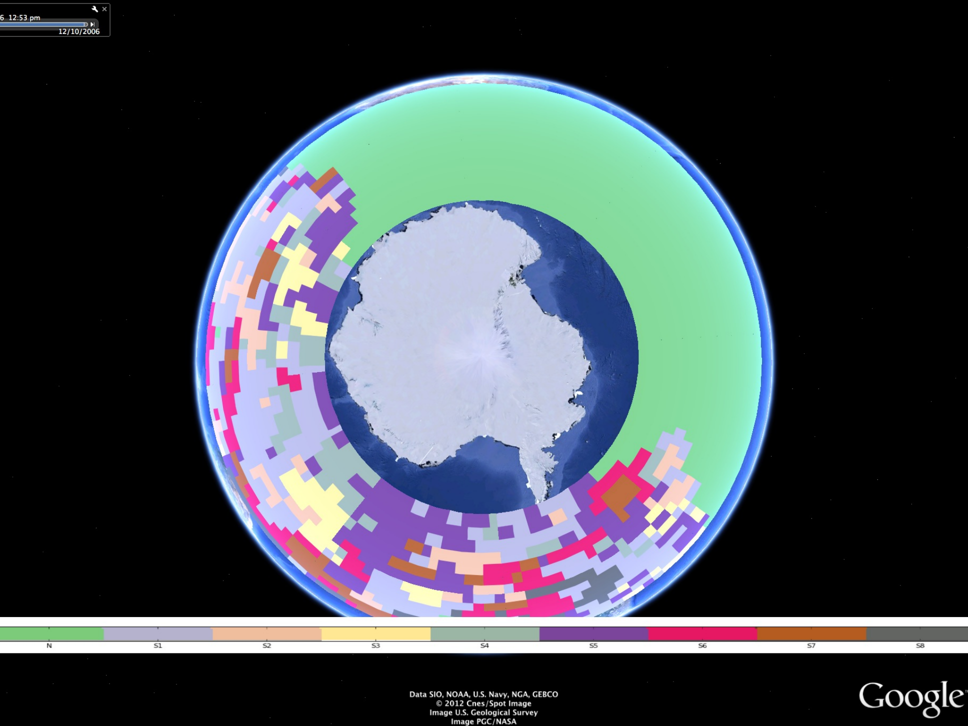
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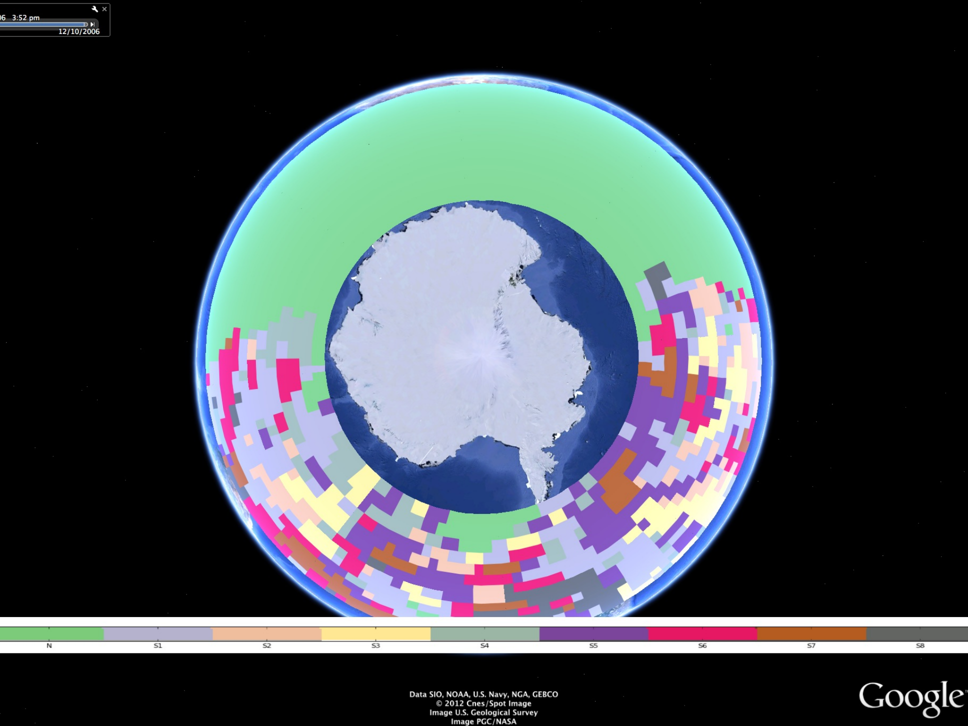

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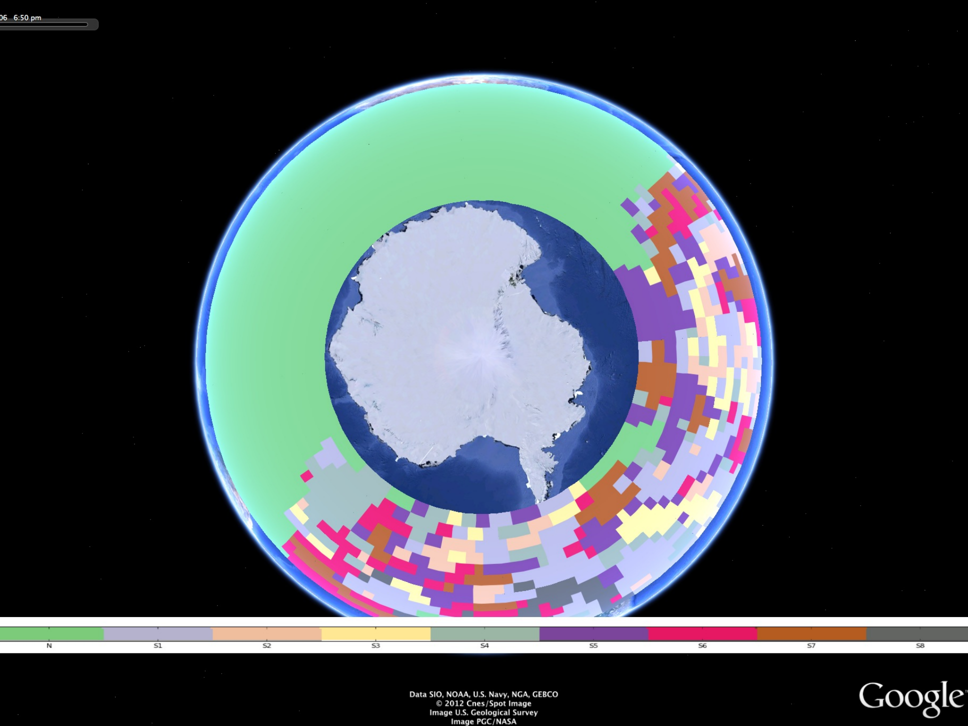
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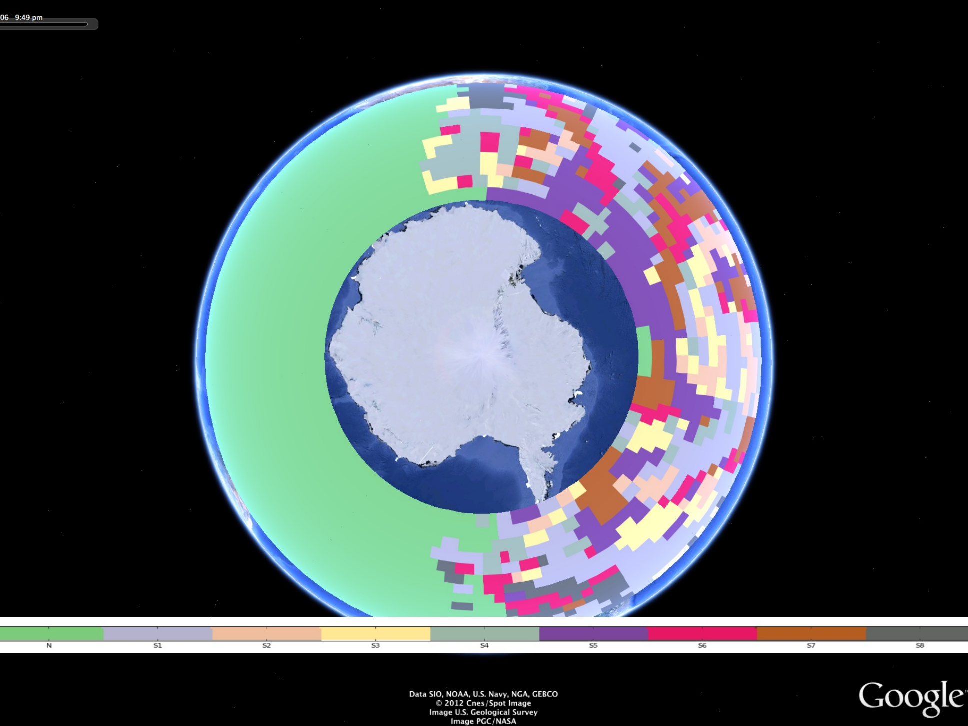
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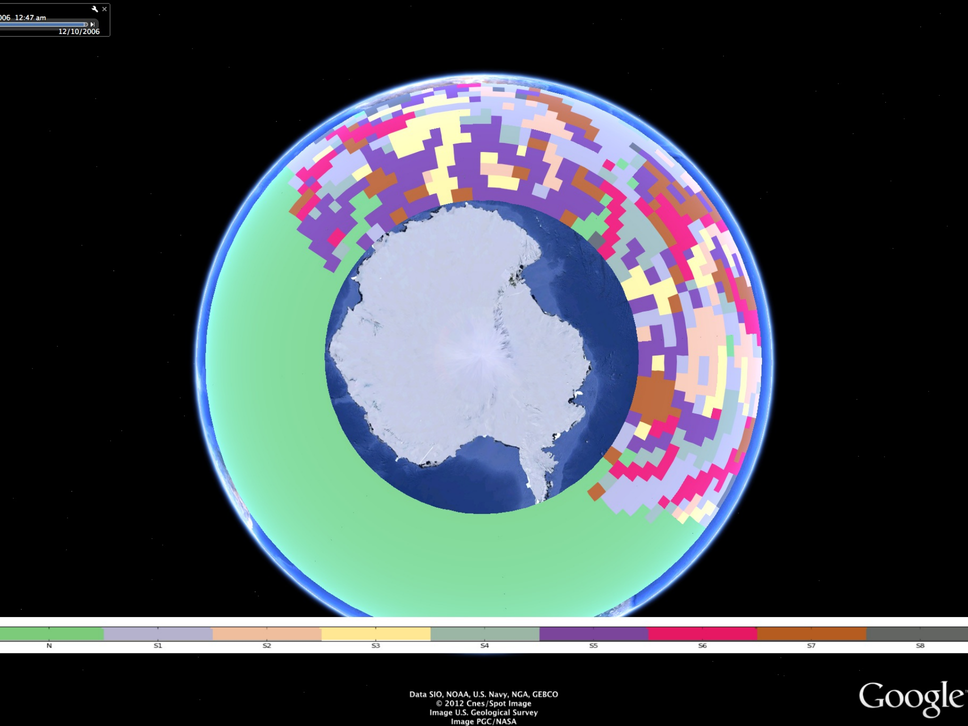

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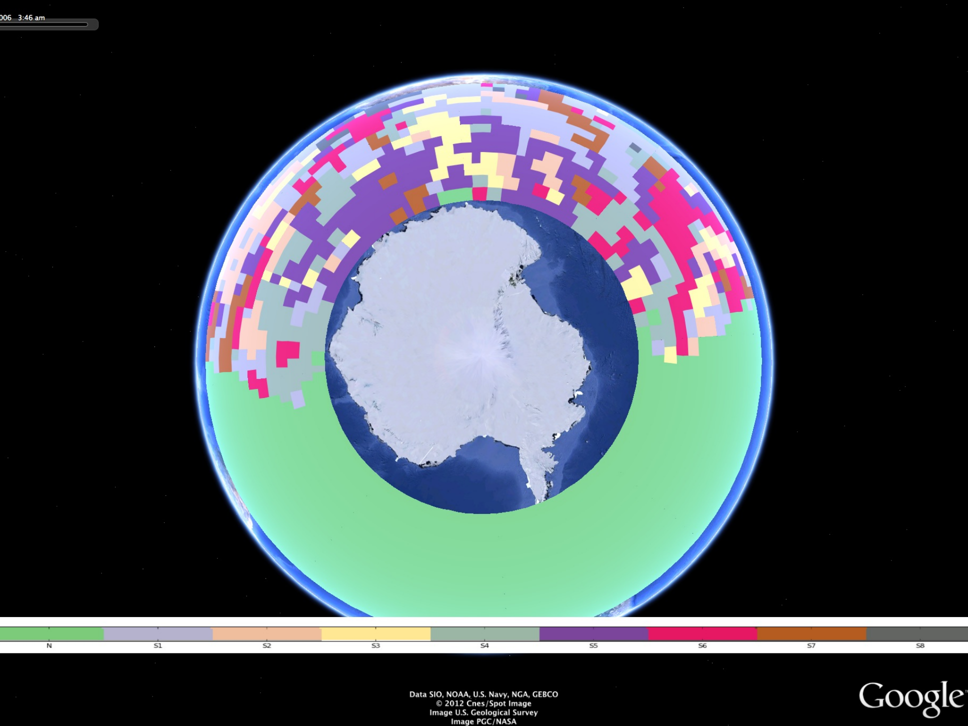
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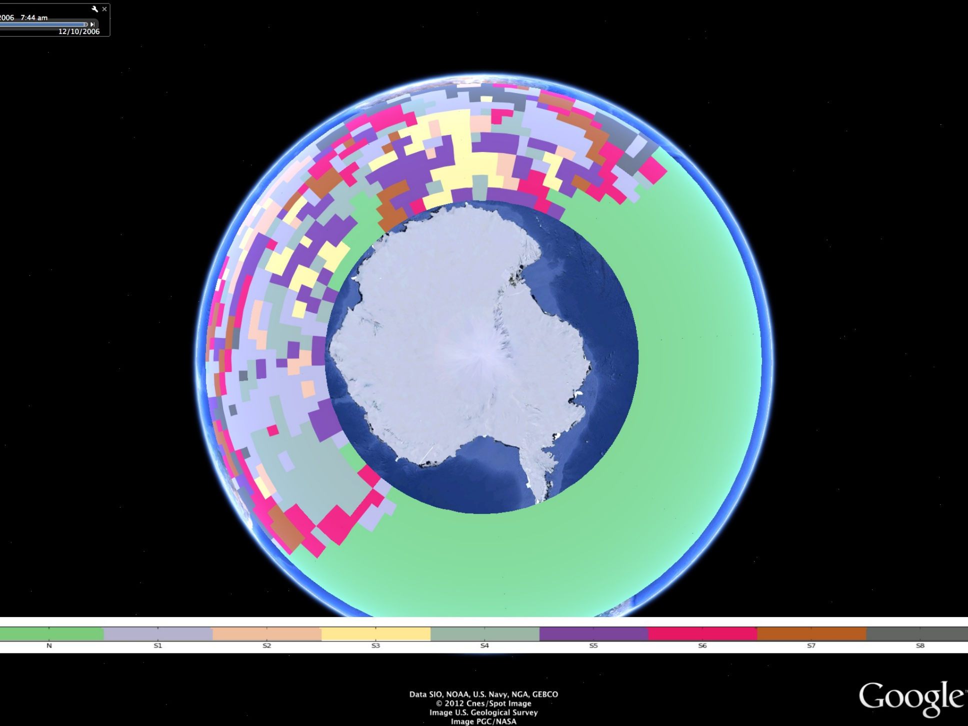

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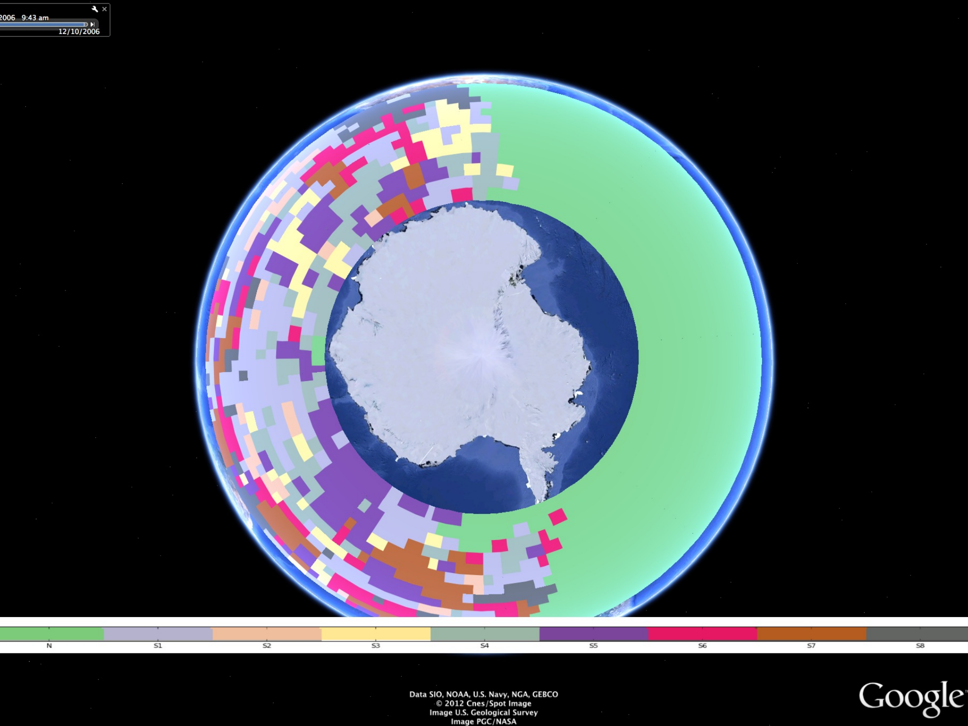
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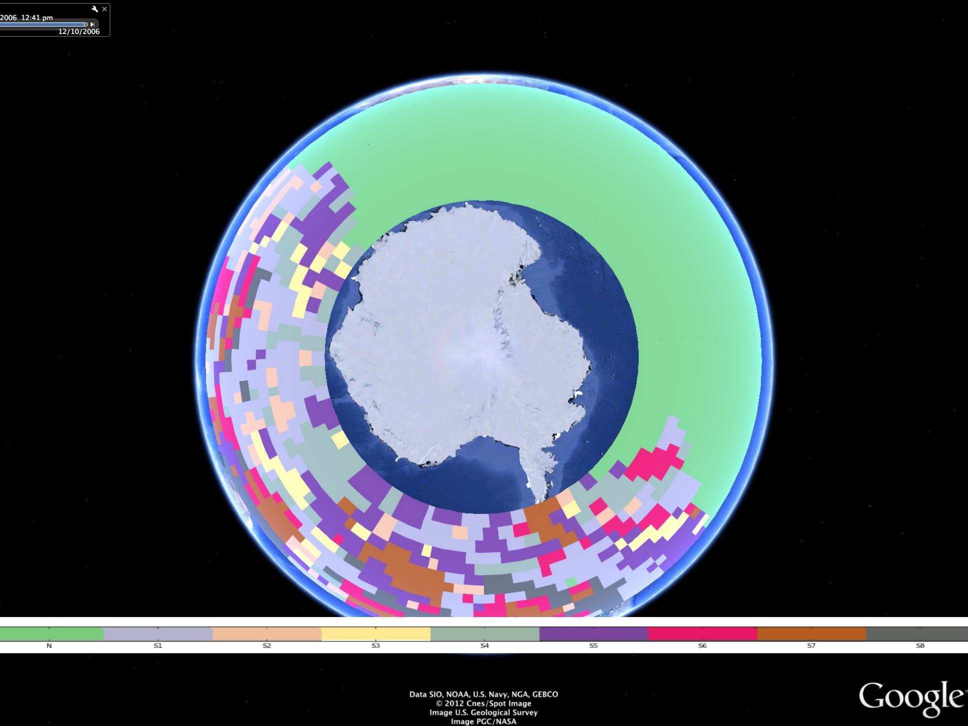
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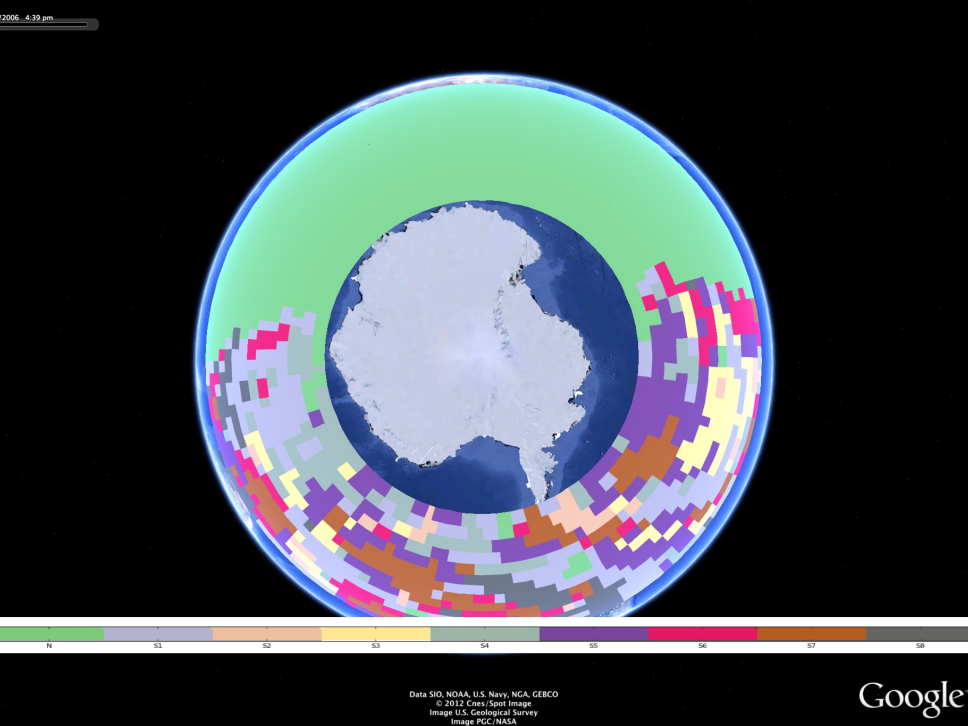
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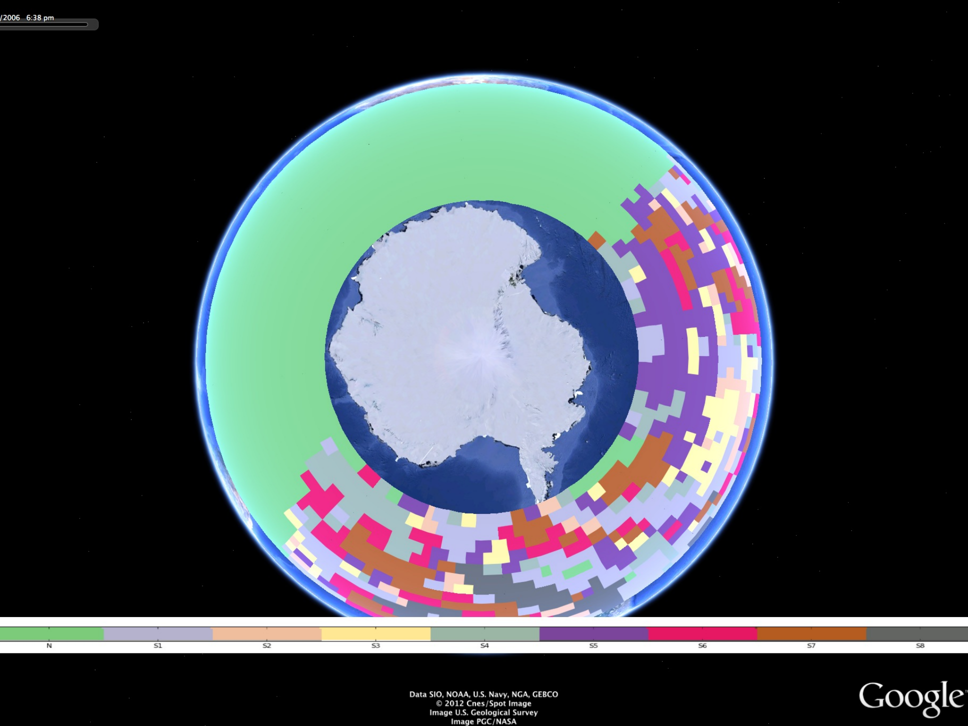
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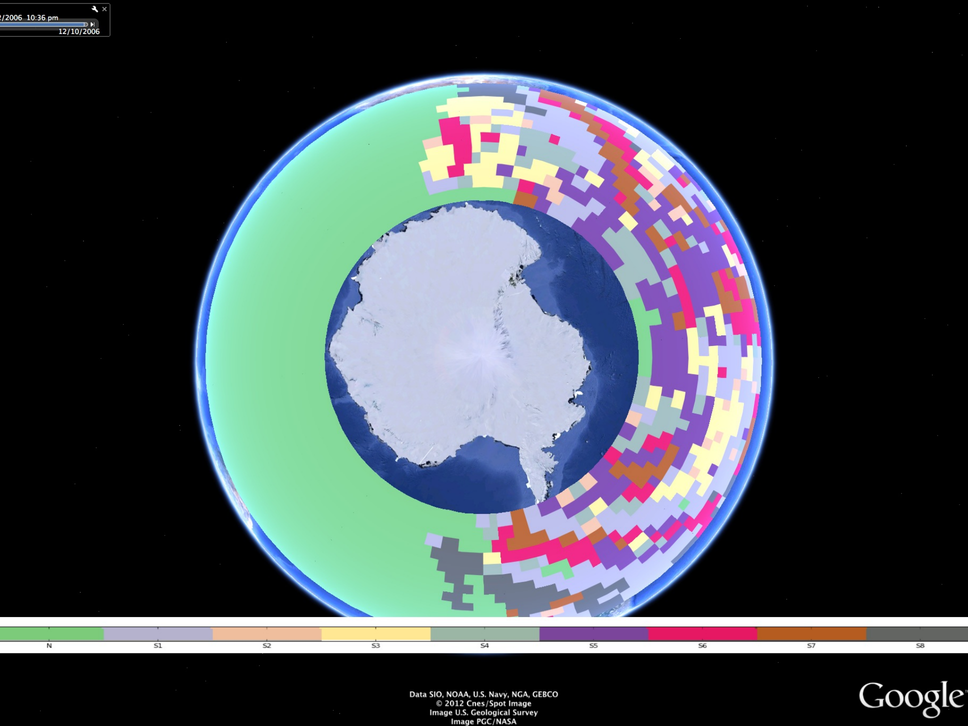

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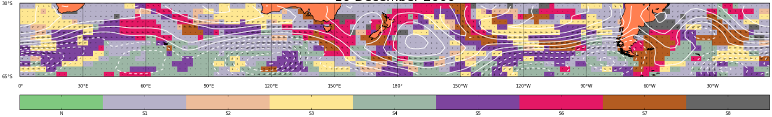
Organisation

10 December 2000



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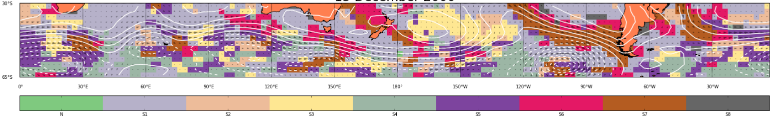

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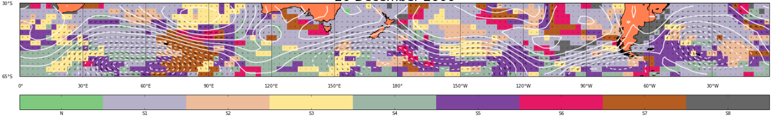

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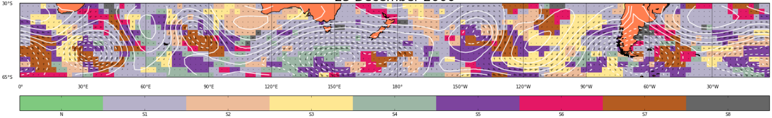

Outline

Future work

- Case studies
- Organisation around extratropical cyclones
- Microphysics