

Antarctic snowfall variability and forced change



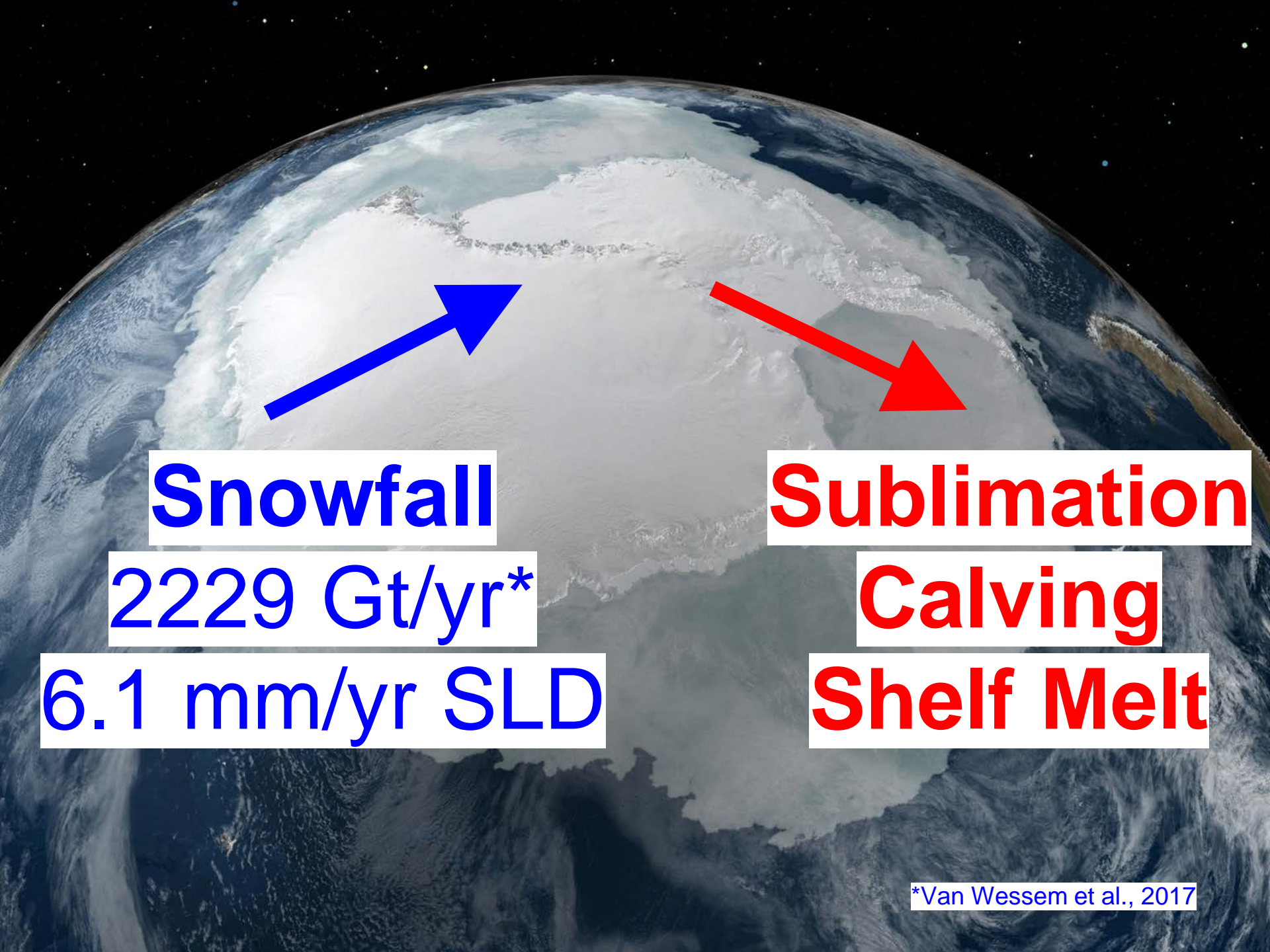
Jan Lenaerts¹, Jeremy Fyke², Brooke Medley³

Marcus L fverstr m⁴, Raymond Sellevold⁵, Miren Vizcaino⁵

CESM LE community, Laura Landrum⁴, Marika Holland⁴, Lorenzo Polvani⁷, Hailong Wang⁸

University of Colorado¹, LANL², NASA Goddard³, NCAR⁴, TU Delft⁵, NASA⁶, Columbia⁷, PNNL⁸





Snowfall

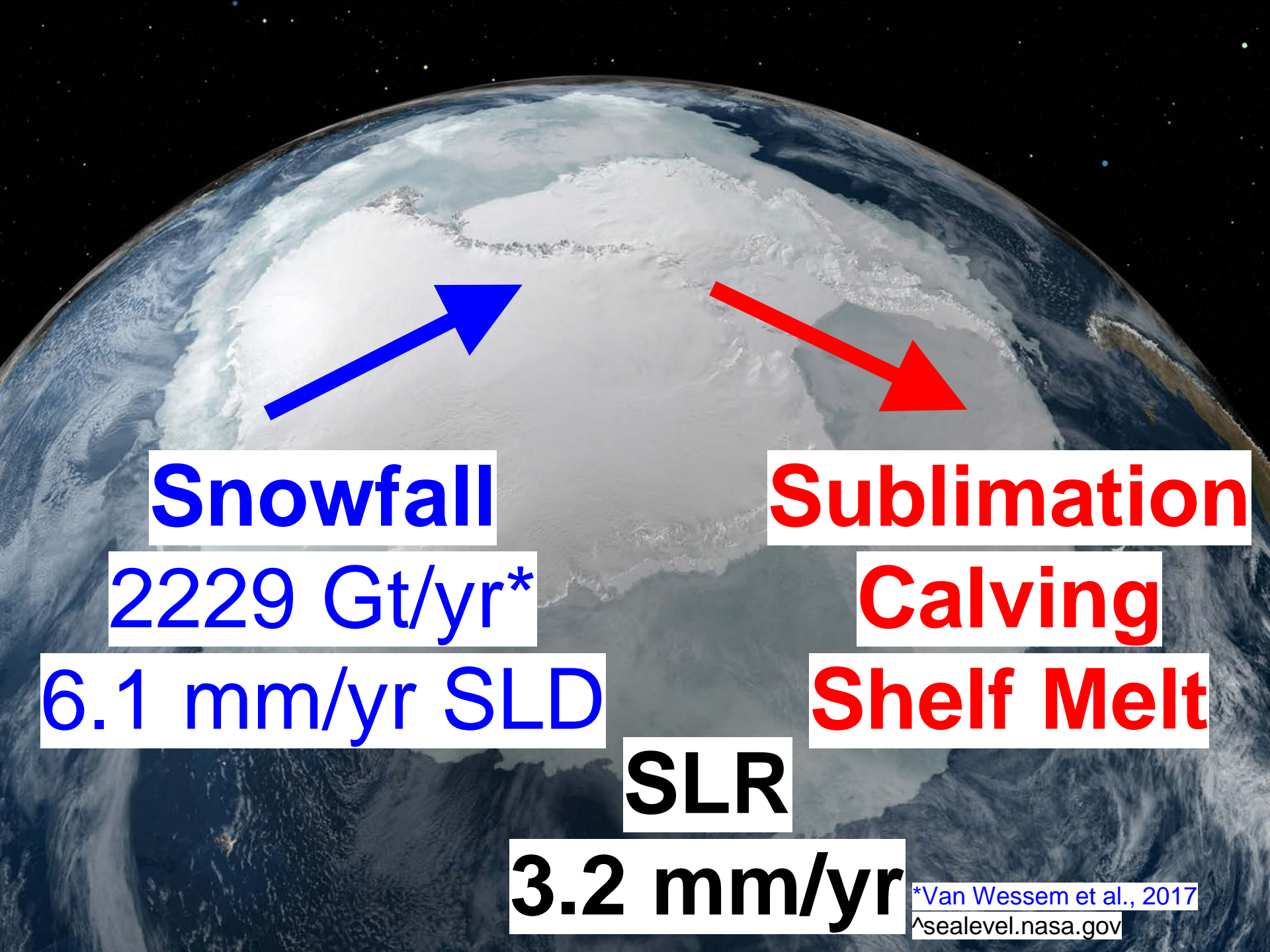
2229 Gt/yr*

6.1 mm/yr SLD

Sublimation

Calving

Shelf Melt



Snowfall

2229 Gt/yr*

6.1 mm/yr SLD

SLR

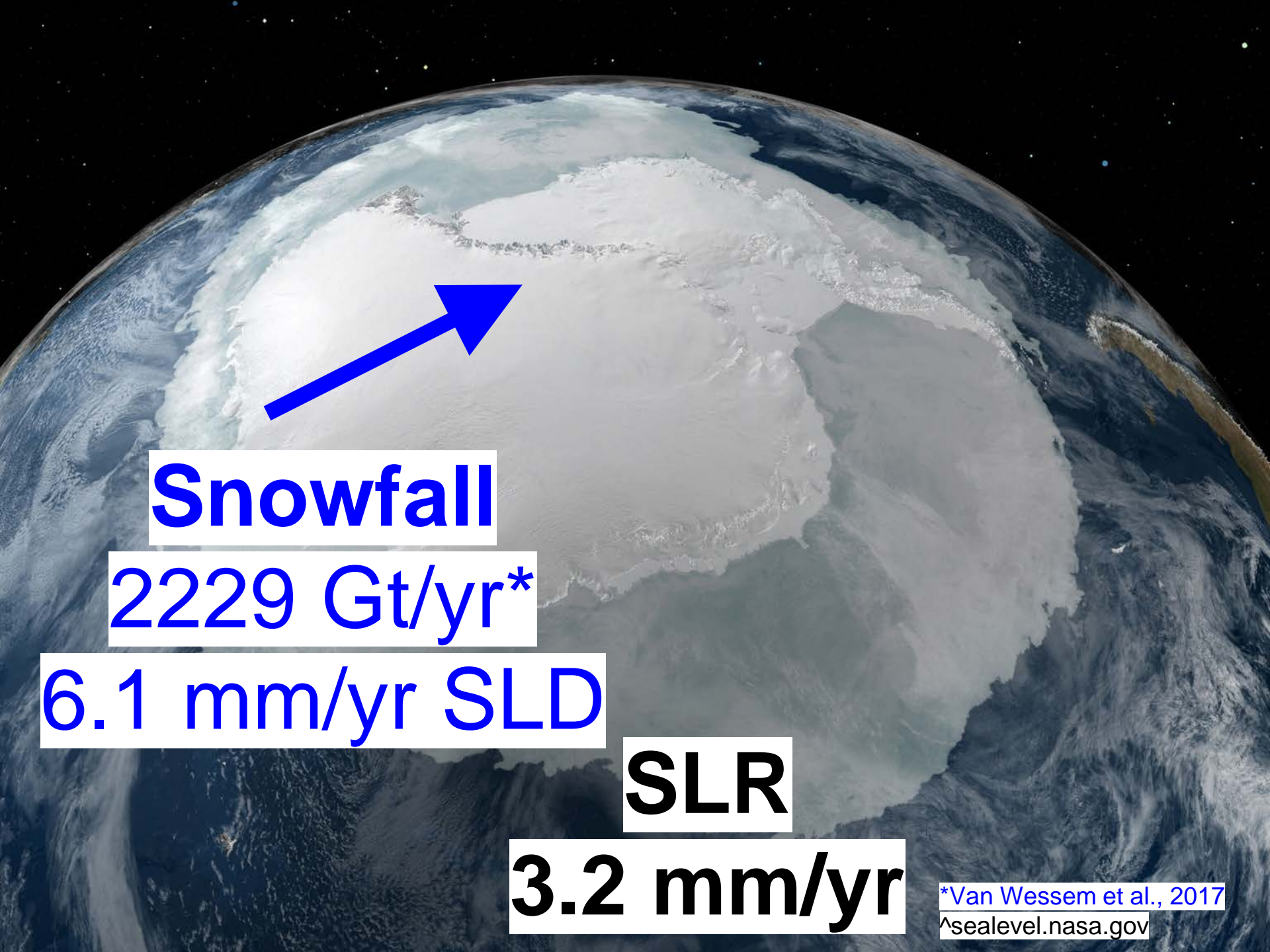
3.2 mm/yr

Sublimation

Calving

Shelf Melt

*Van Wessem et al., 2017
^sealevel.nasa.gov



Snowfall

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SLR

3.2 mm/yr

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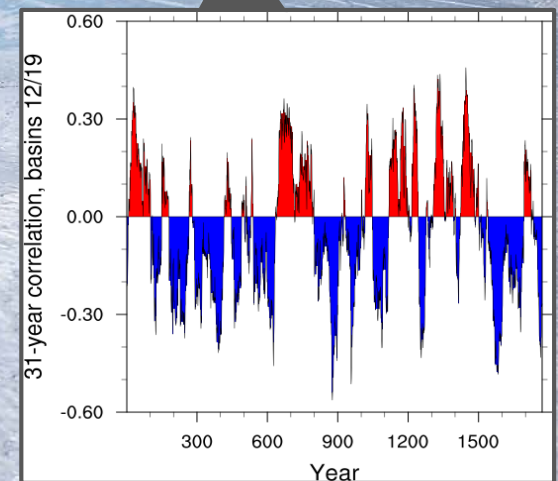
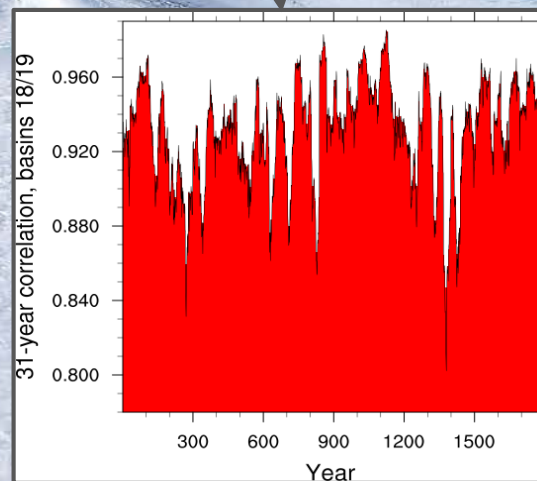
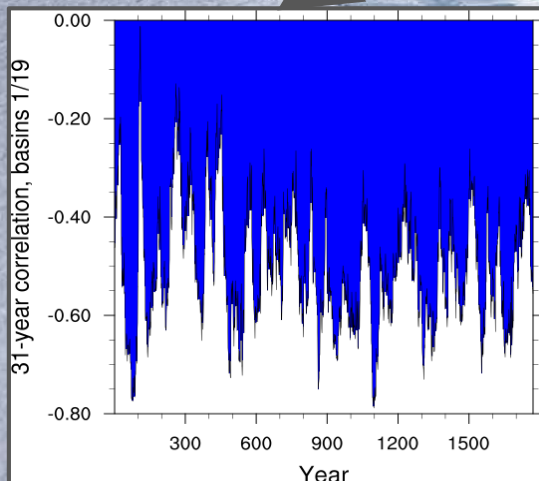
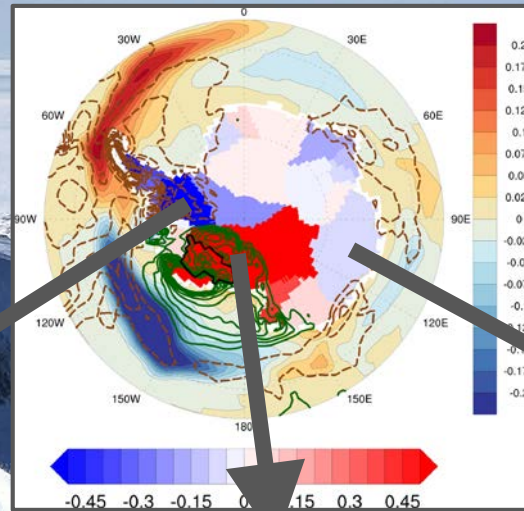
Patterns in AIS variability controlled by regional atmospheric circulation

(Fyke, Lenaerts and Wang, 2017, The Cryosphere)



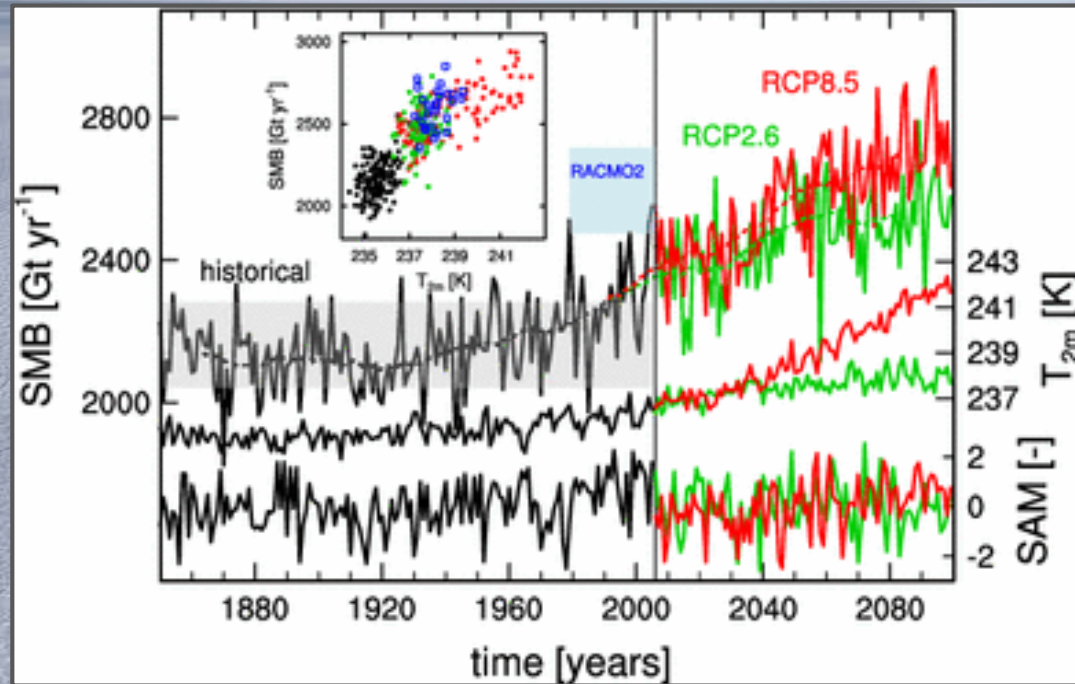
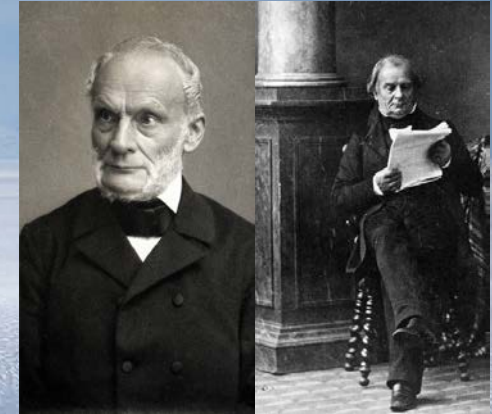
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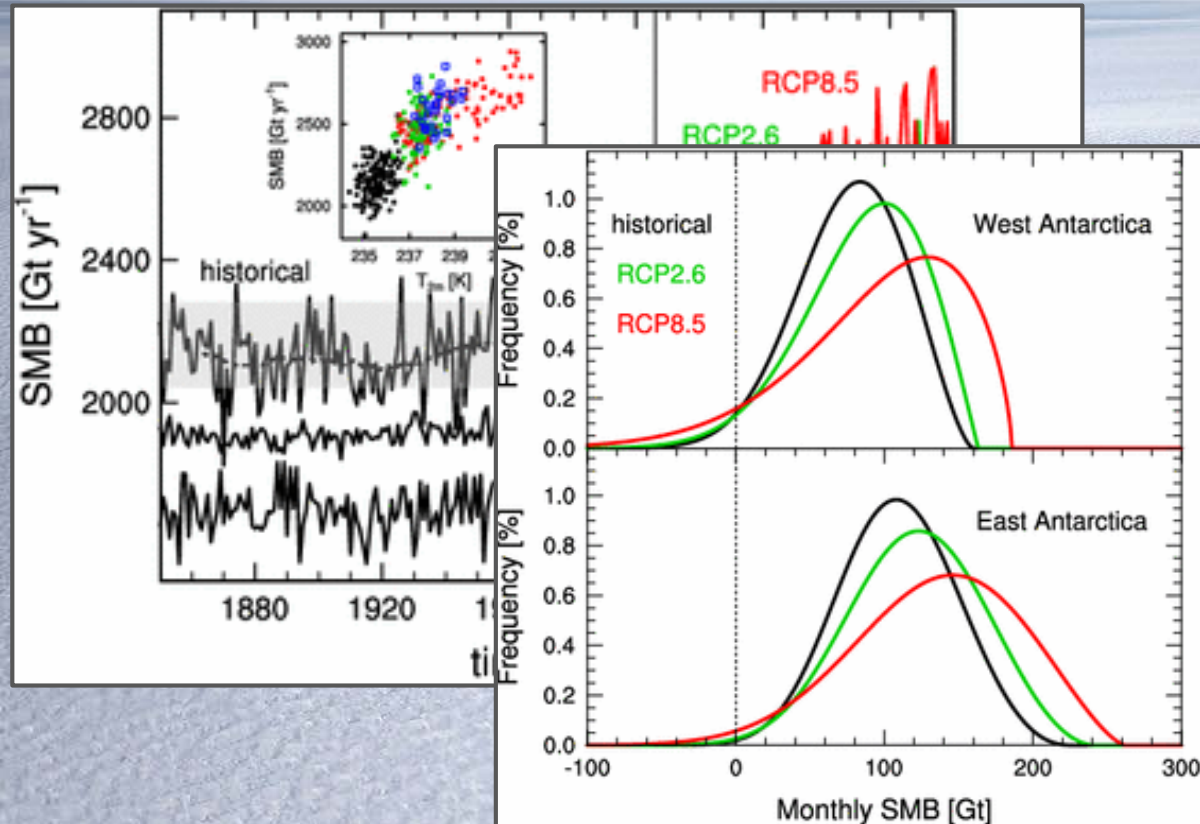
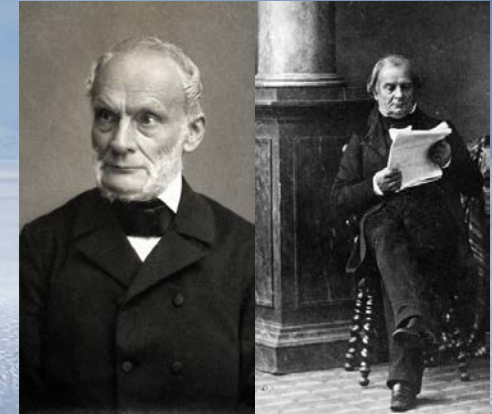
AIS snowfall will strongly increase in response to anthropogenic forcing

(Lenaerts et al., 2016, Climate Dynamics)



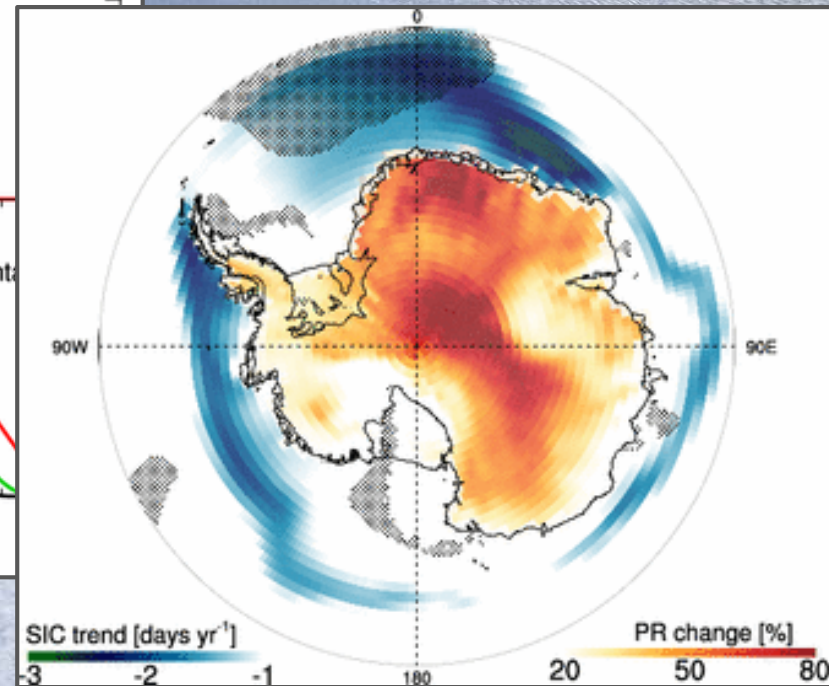
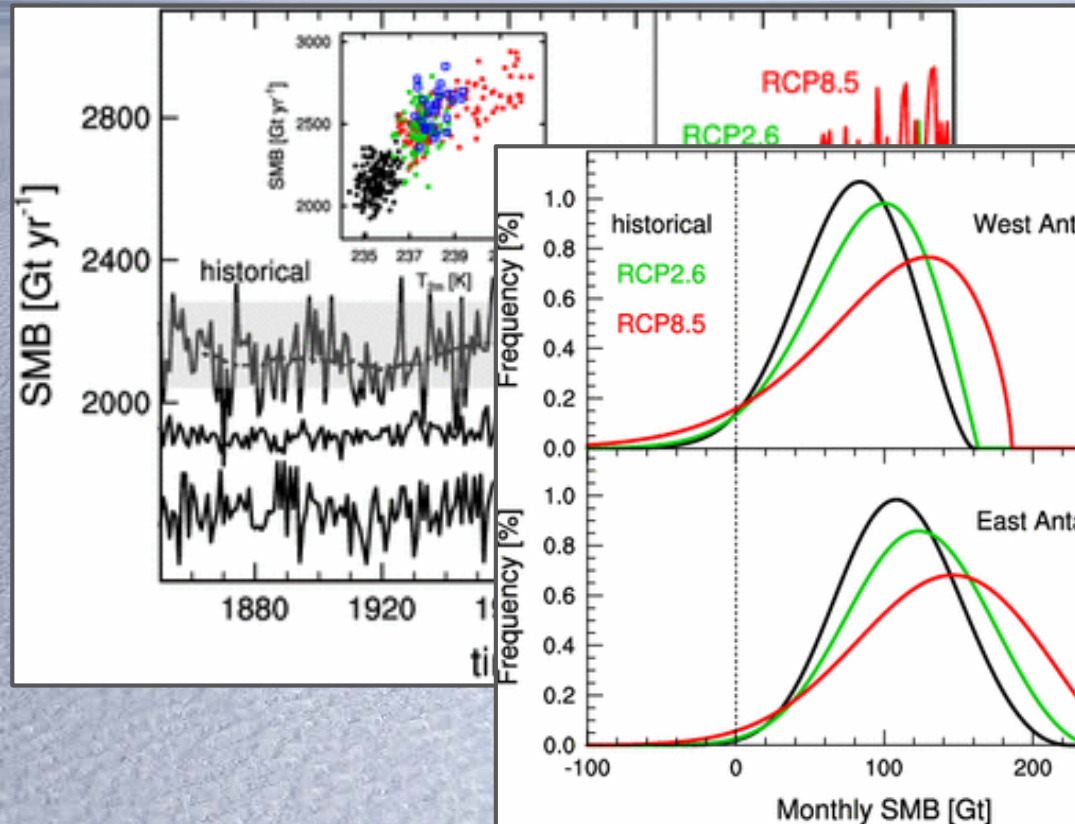
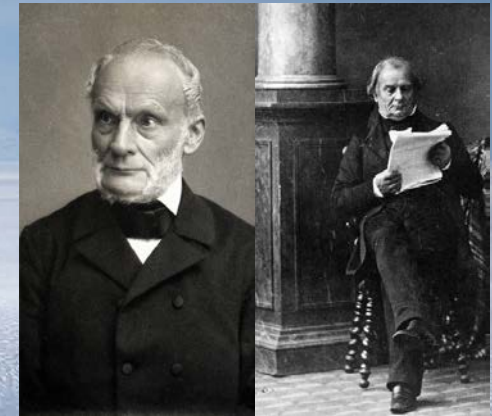
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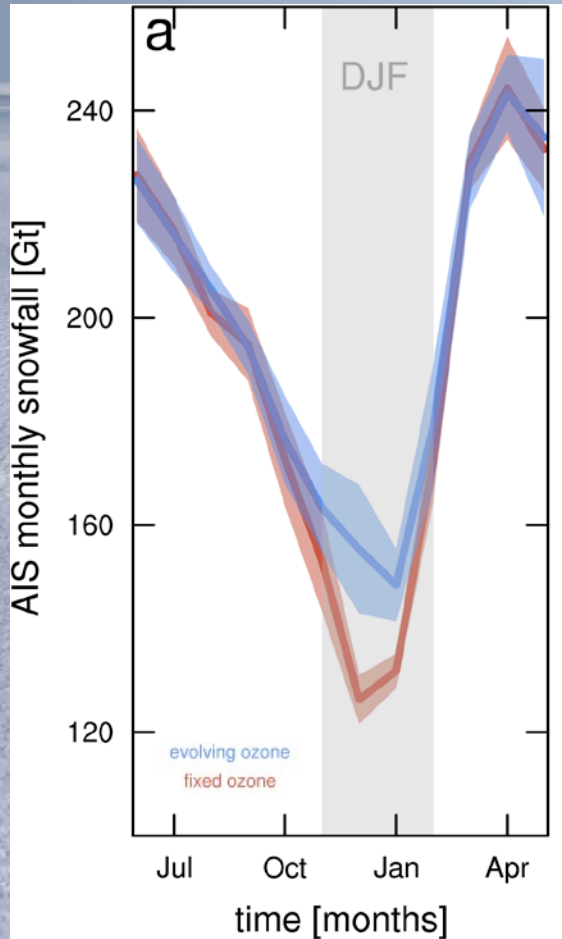
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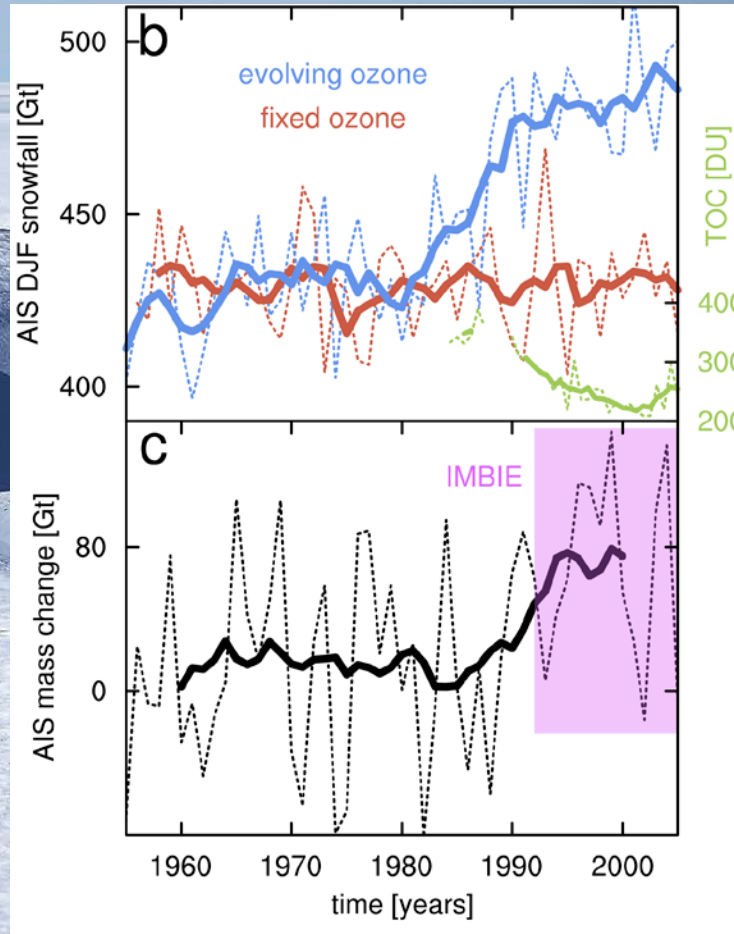
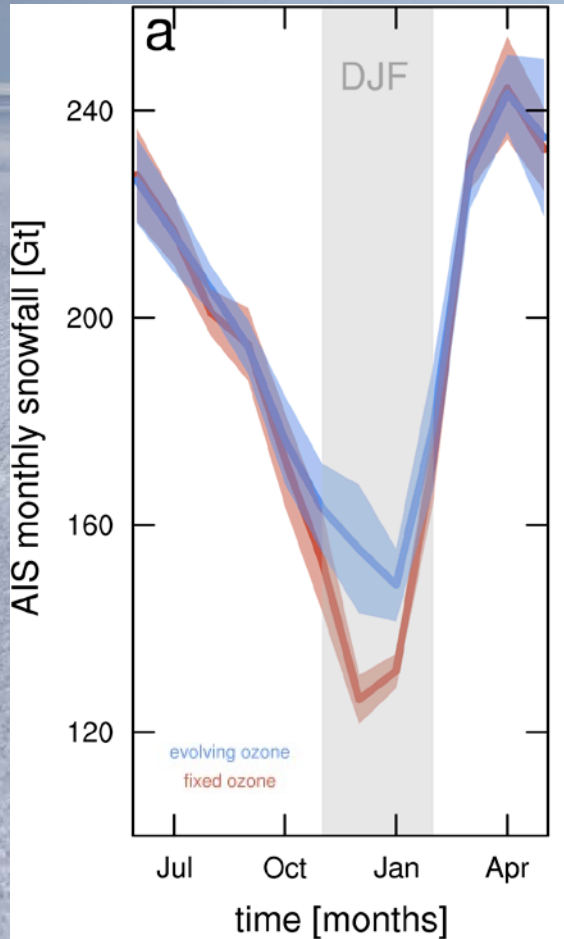
Recent snowfall trends display strong ozone signature

(Fyke/Lenaerts and Medley, in review)



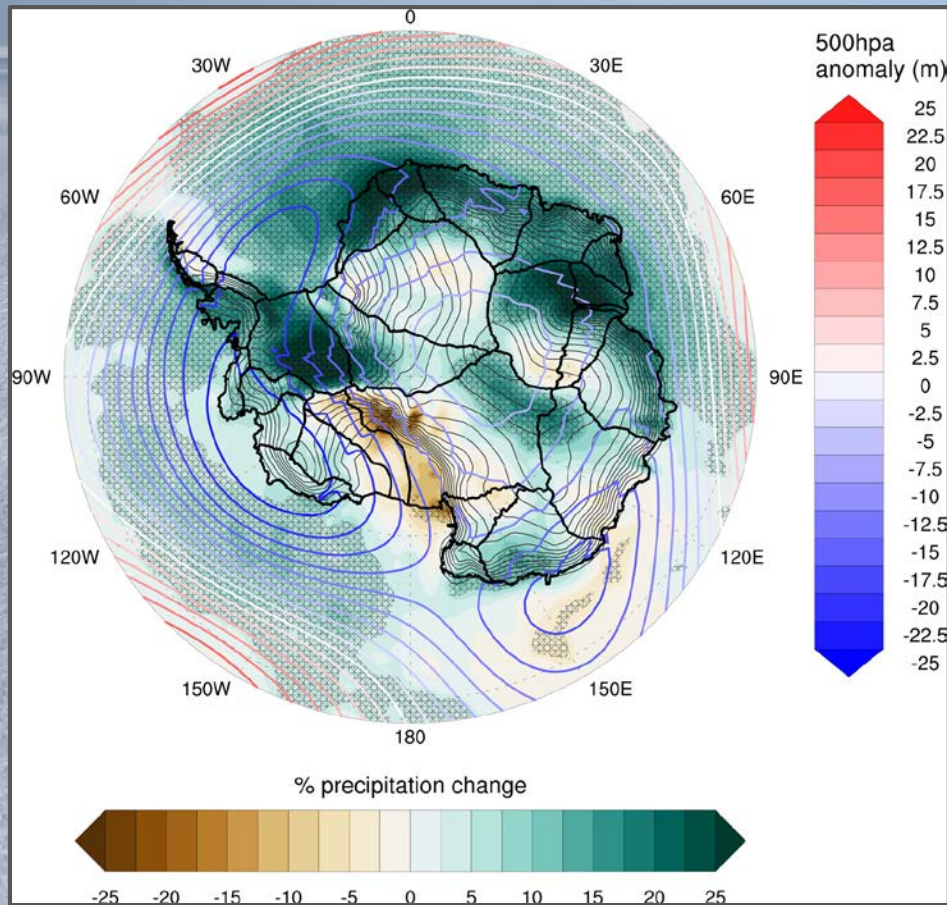
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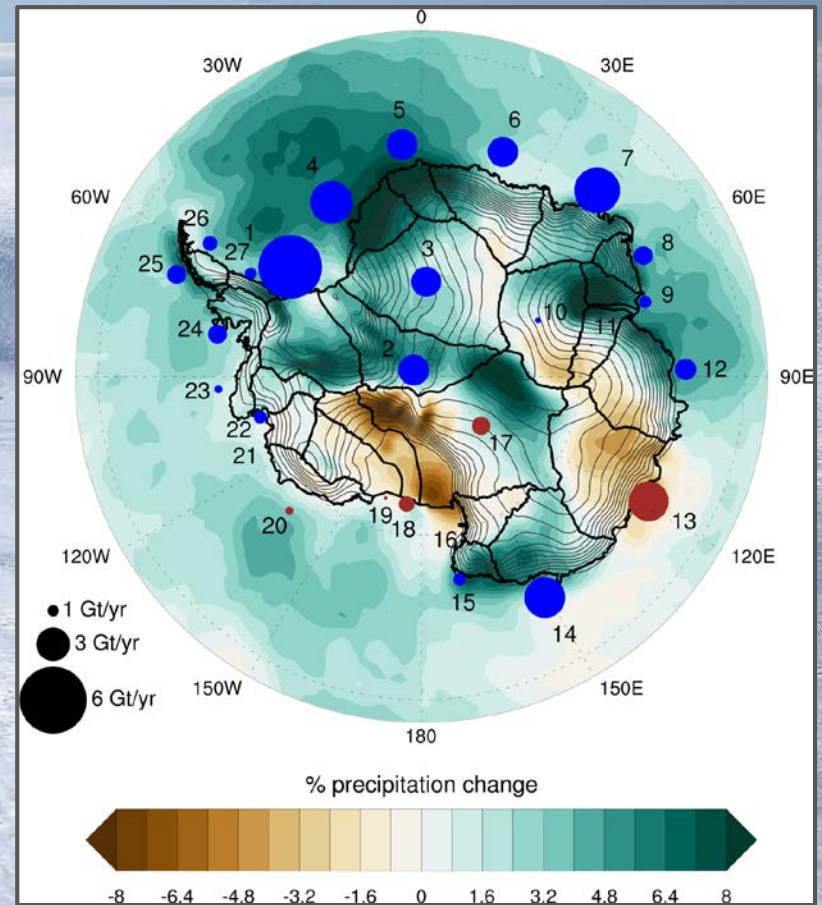
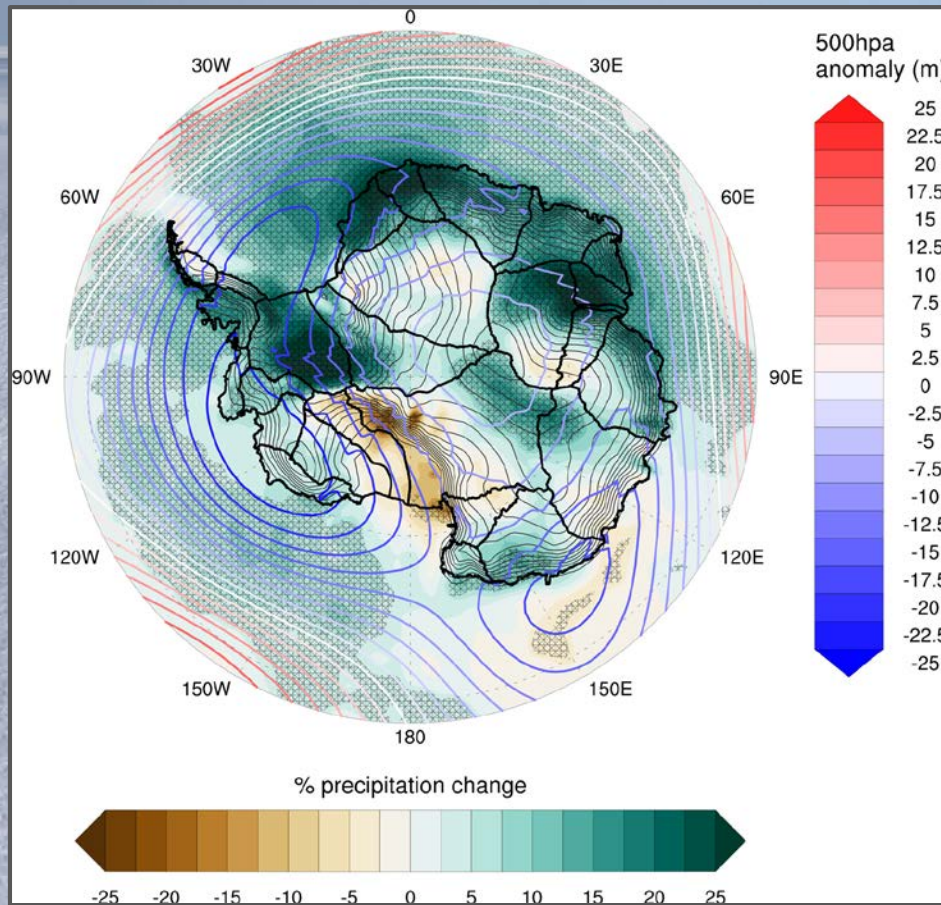
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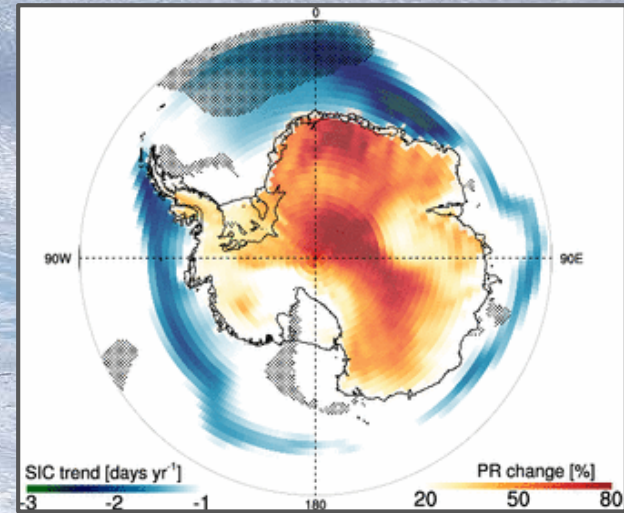
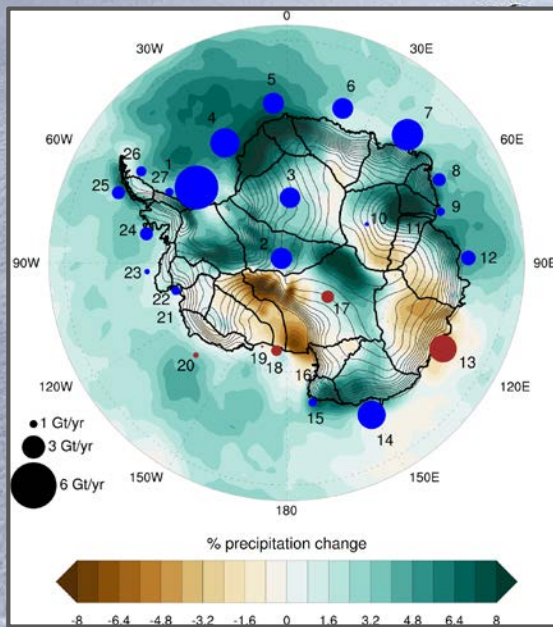
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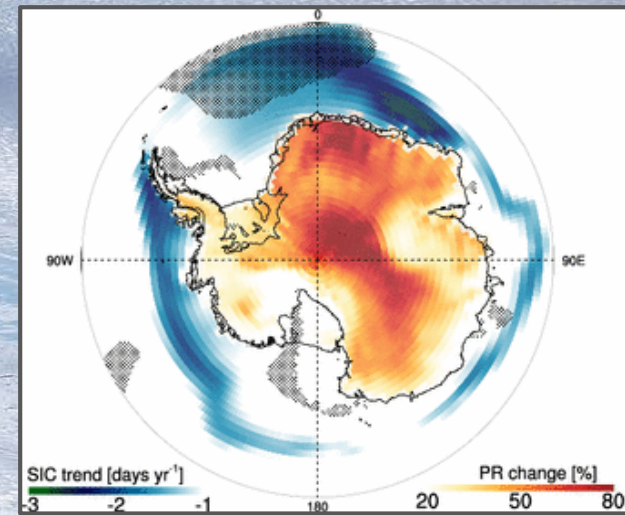
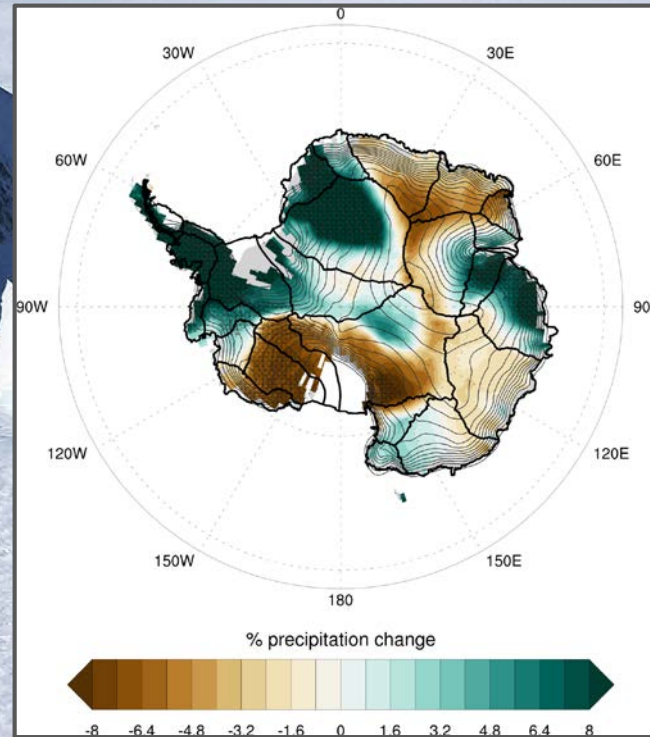
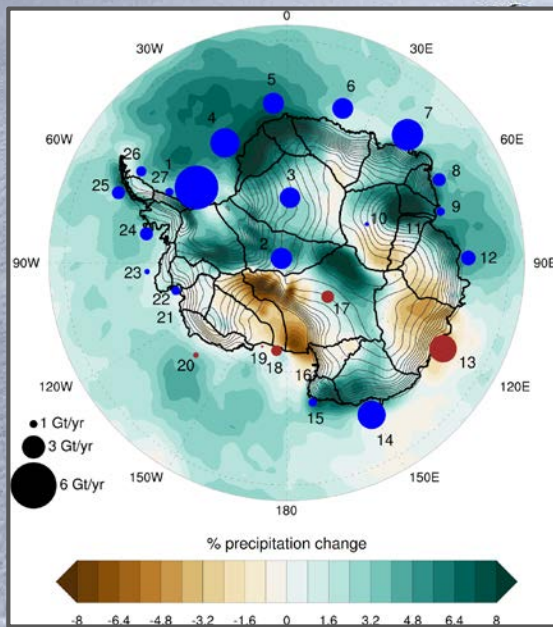
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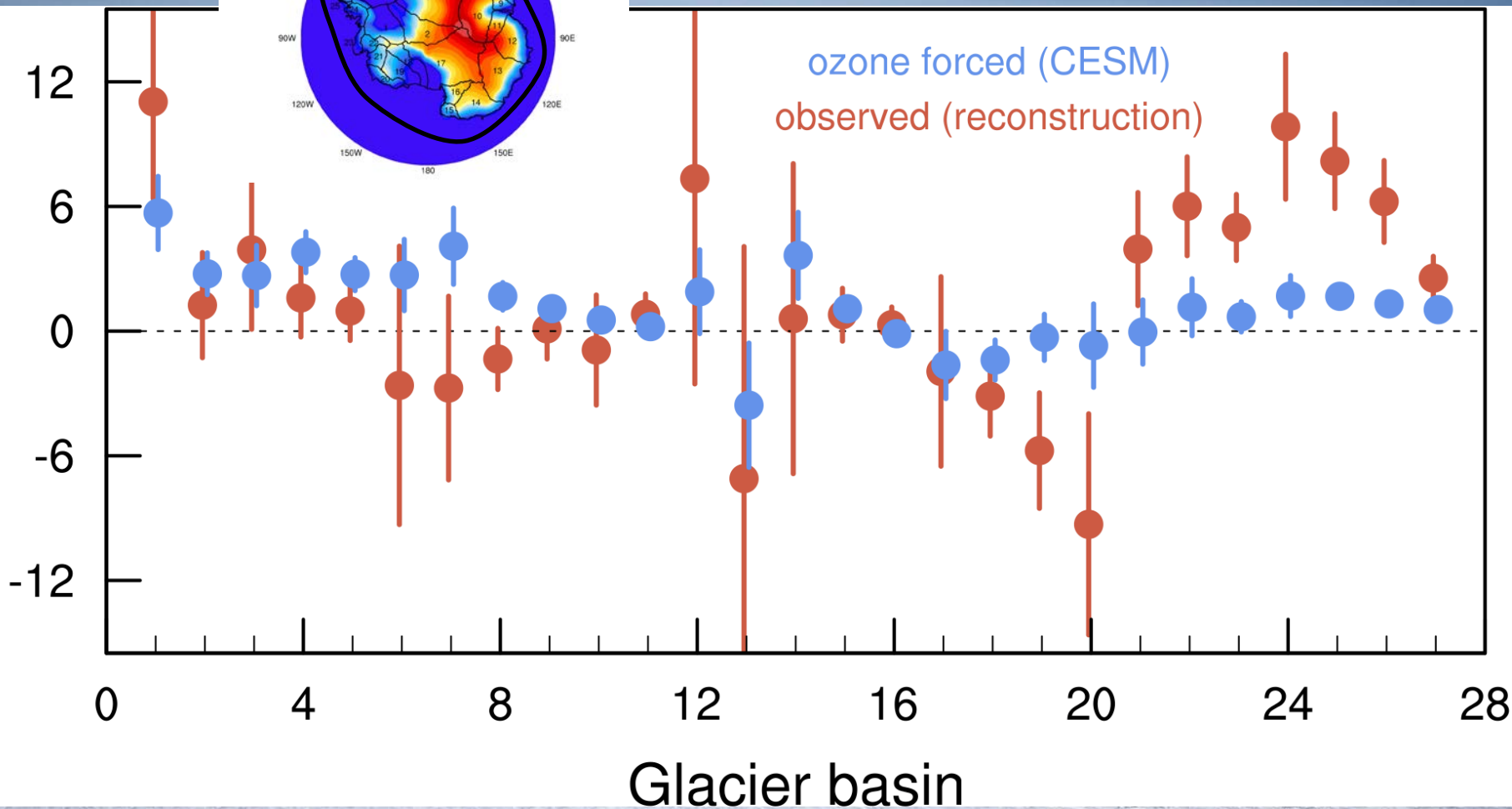


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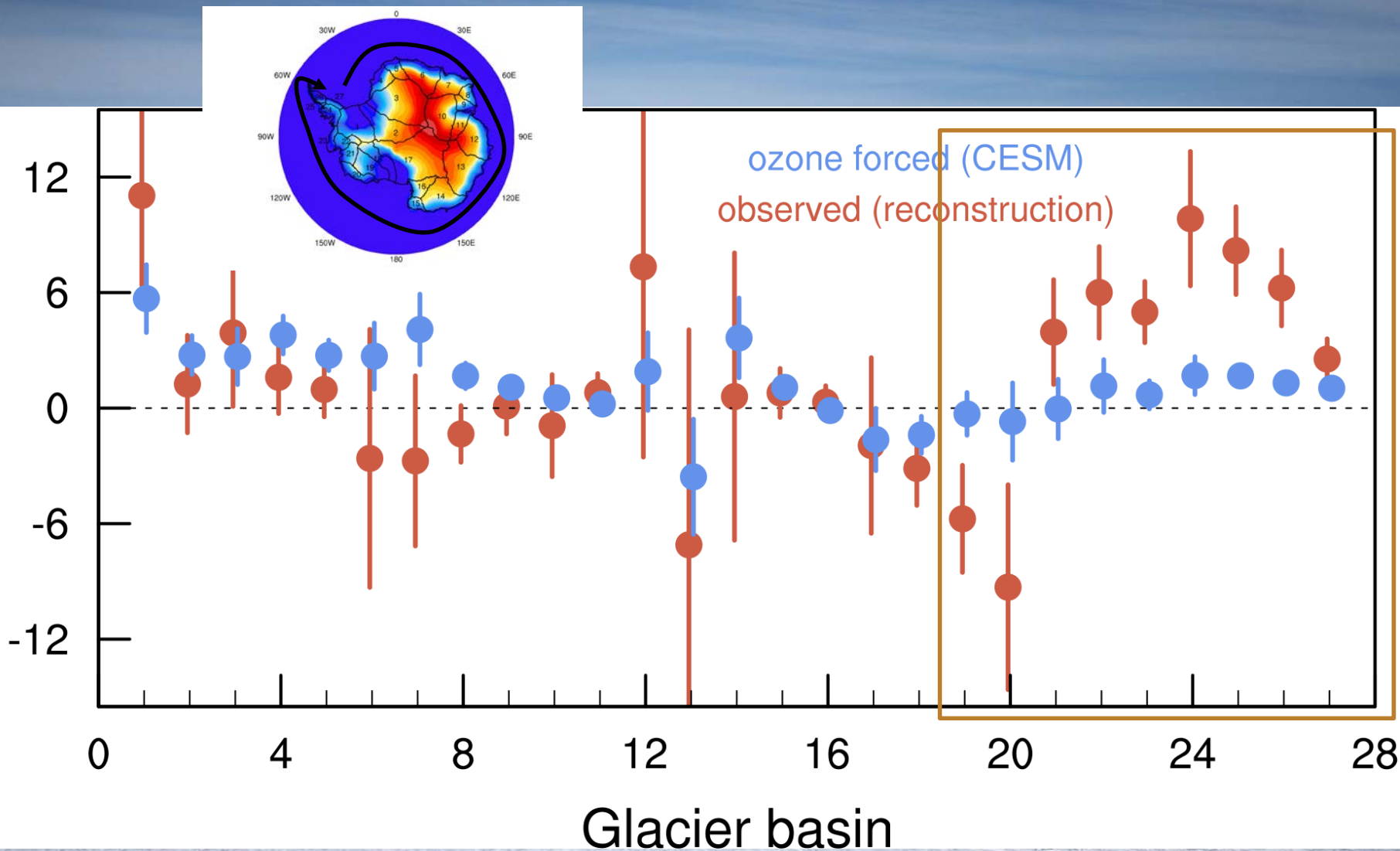
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Mass change [Gt yr⁻¹]



Mass change [Gt yr⁻¹]



Antarctic snowfall variability and forced change

Antarctic snowfall is important for sea level!

Patterns in AIS snowfall variability controlled by atmospheric circulation

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Future work

- **Moisture tracking**
- **Extreme precipitation analysis**
- **Single level forcing**
- **CESM2: better surface melt climate**

