

# The solar wind's geomagnetic impact and its Sun–Earth evolution

Predictive models for space weather and for the Parker Solar Probe orbit

PhD defense by  
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Thursday, 1 November 2018, 14:00  
Seminarraum Astrophysik (SR 17, F 05.104)

# Two topics

## Title

The solar wind's geomagnetic impact and its Sun–Earth evolution

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Predictive models for space weather and for the Parker Solar Probe orbit

# Two topics

## Study 1

The solar wind's geomagnetic impact – Predictive models for space weather

# Two topics

## Study 1

The solar wind's geomagnetic impact – Predictive models for space weather

## Study 2

The solar wind's Sun–Earth evolution – Predictive models for the Parker Solar Probe orbit

## 1 Solar wind

## 2 Geomagnetic impact of the solar wind

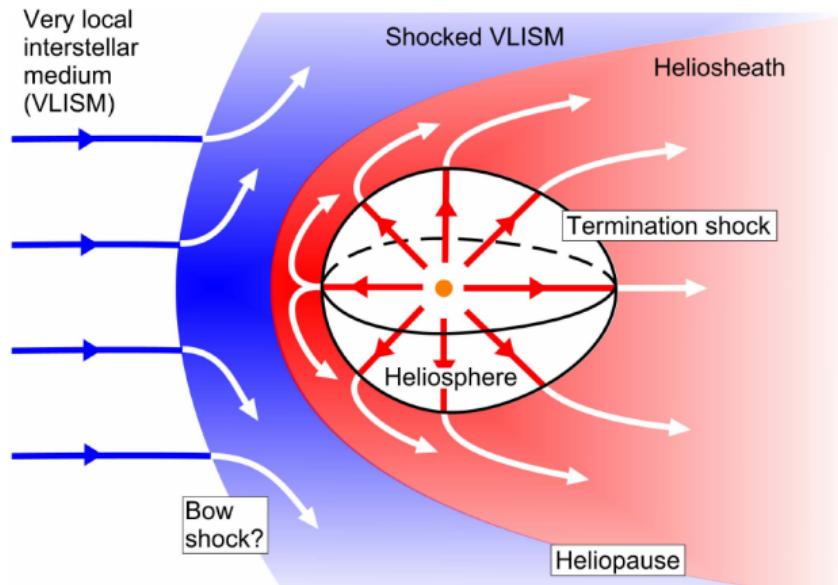
## 3 Solar wind model for the inner heliosphere

## Solar wind



Credit: Miloslav Druckmüller, Peter Aniol, Jan Sládeček, 2008

# Solar wind



Credit: Owens & Forsyth (2013, Fig. 9)

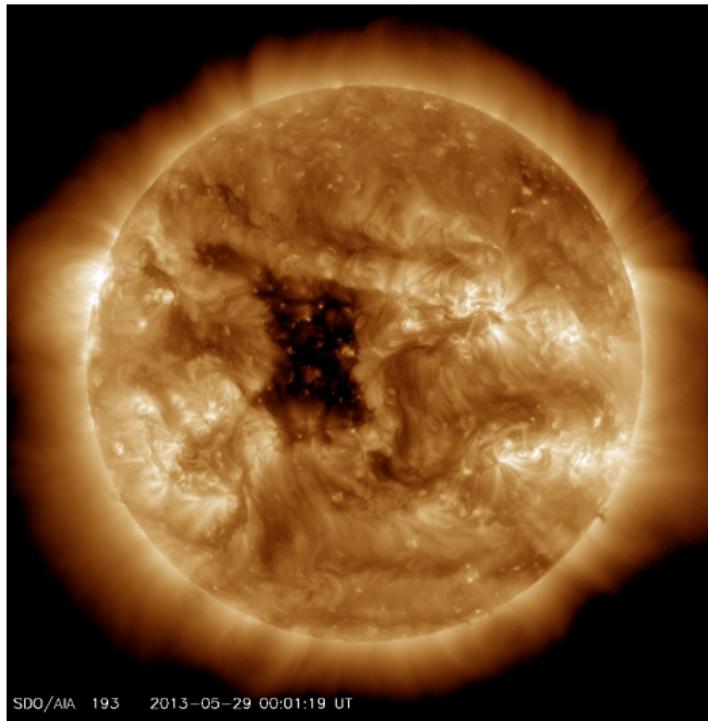
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References

# Solar wind



Credit: NASA/SDO and the AIA, EVE and HMI science teams

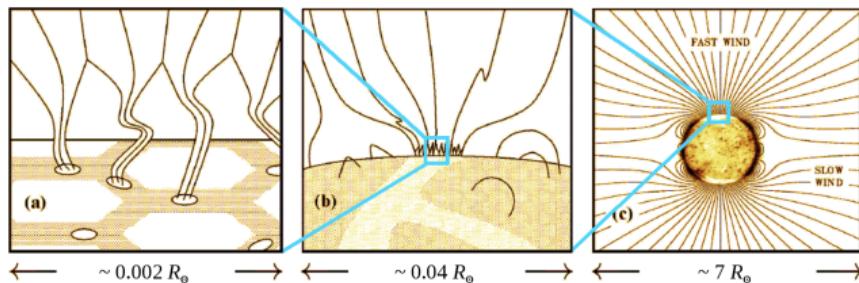
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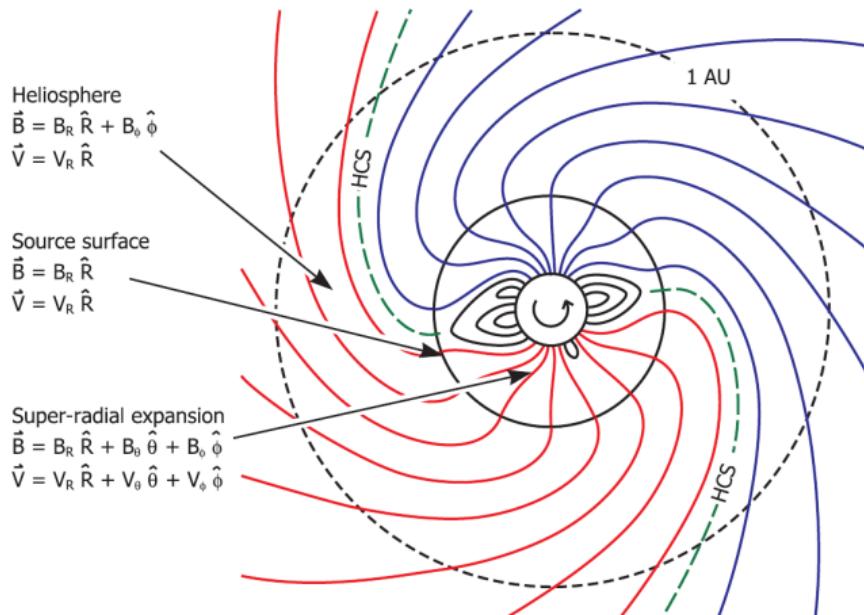
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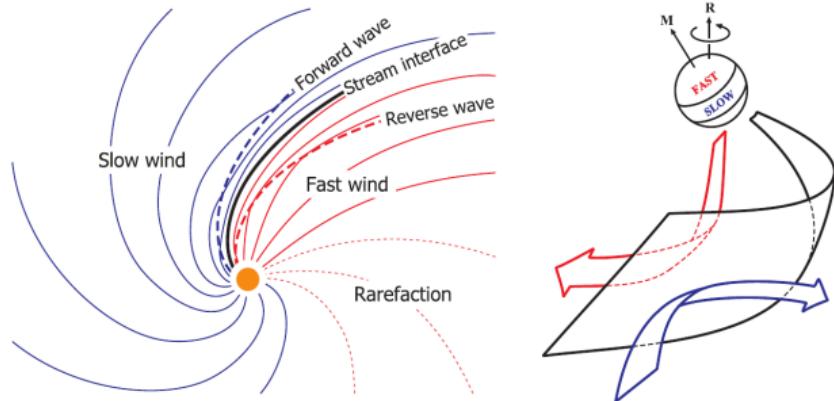
Courtesy of S. R. Cranmer

# Solar wind



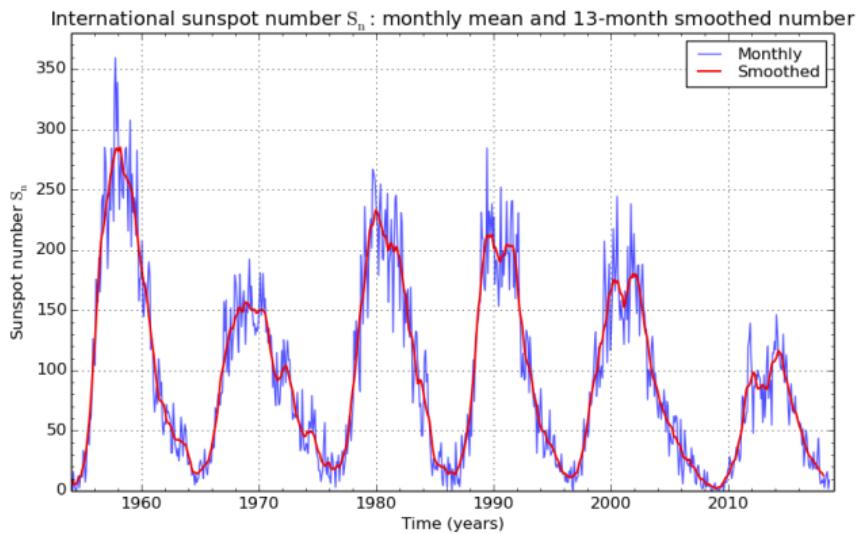
Credit: Owens & Forsyth (2013, Fig. 1), adapted from Schatten et al. (1969, Fig. 1)

# Solar wind



Credit: Owens & Forsyth (2013, Fig. 7); right panel adapted from Pizzo (1991, Fig. 2)

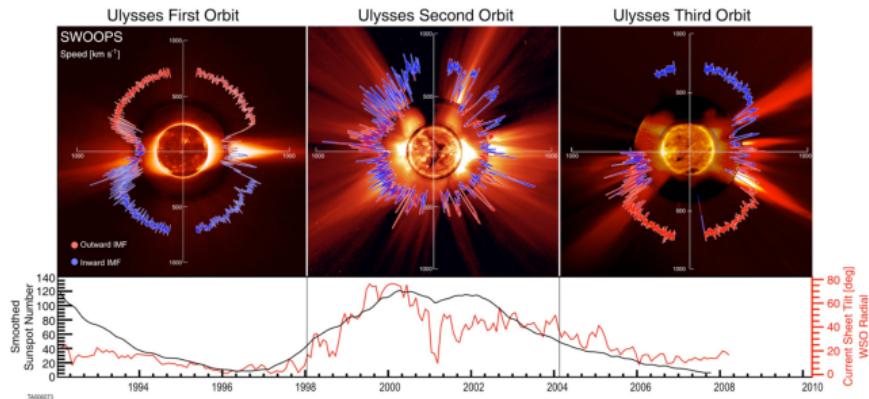
# Solar wind



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2018 September 1

Credit: SILSO data/image, Royal Observatory of Belgium, Brussels, 2018

# Solar wind



Credit: McComas et al. (2008a, Fig. 1)

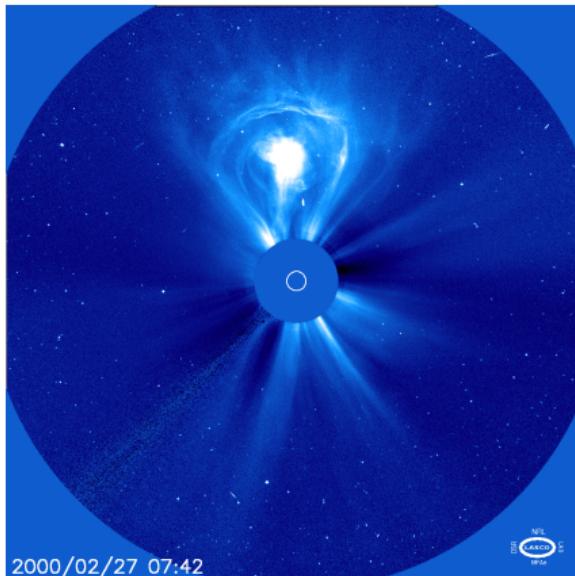
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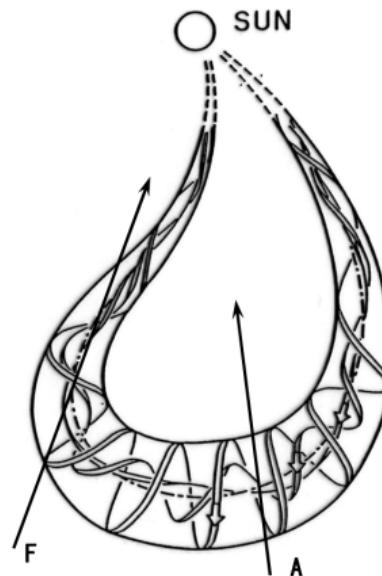
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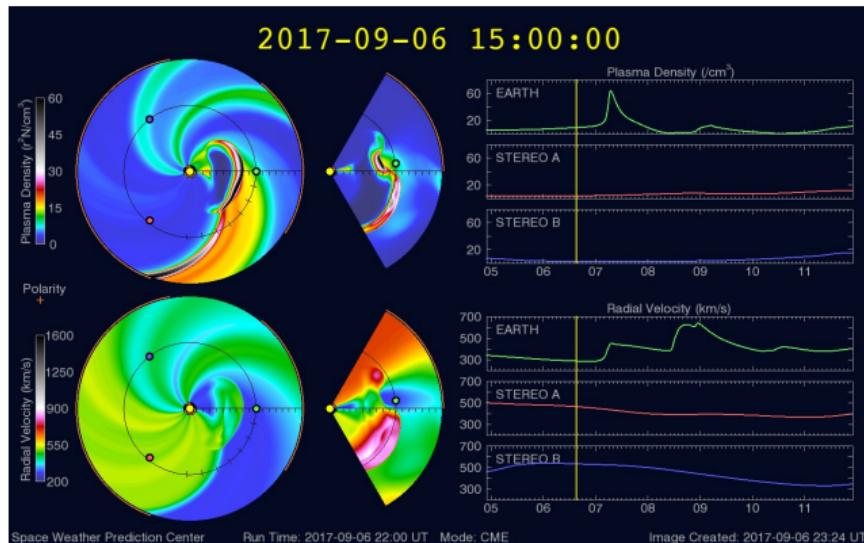


Courtesy of SOHO/LASCO consortium. SOHO is a project of international cooperation between ESA and NASA



Credit: Marubashi & Lepping (2007, Fig. 1, panel (a))

# Solar wind



Credit: SWPC: WSA-Enlil Solar Wind Prediction. NOAA National Centers for Environmental Information

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Solar wind model for the inner heliosphere  
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## 1 Solar wind

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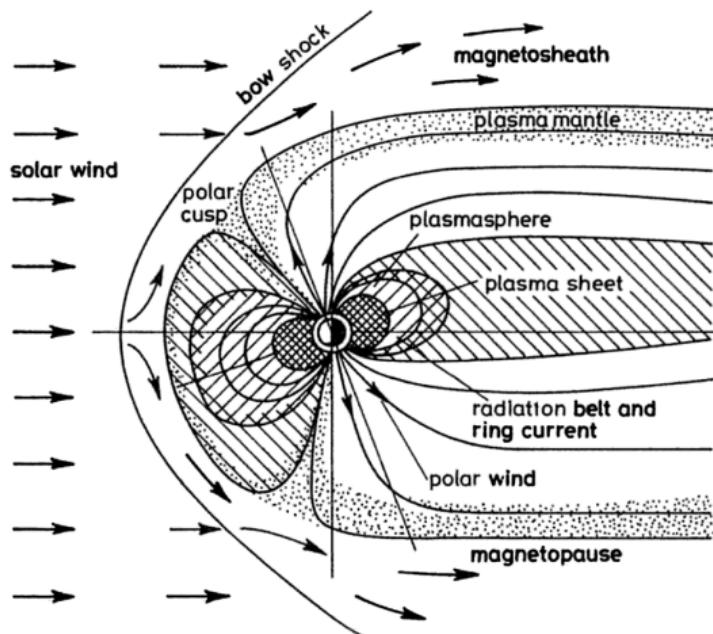
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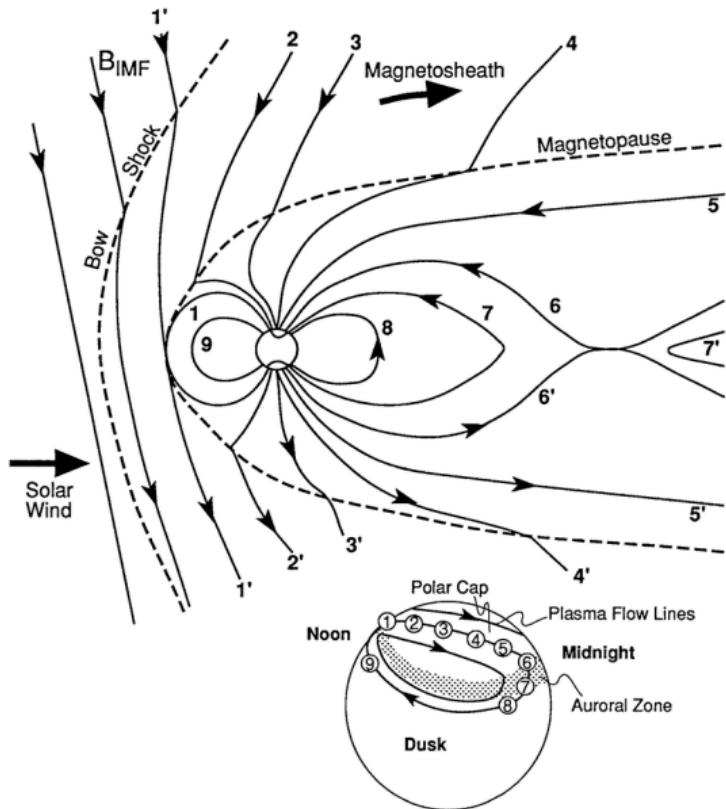
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Credit: Davies (1990, Fig. 2.12)



Credit: Hughes (1995, Fig. 9.11)

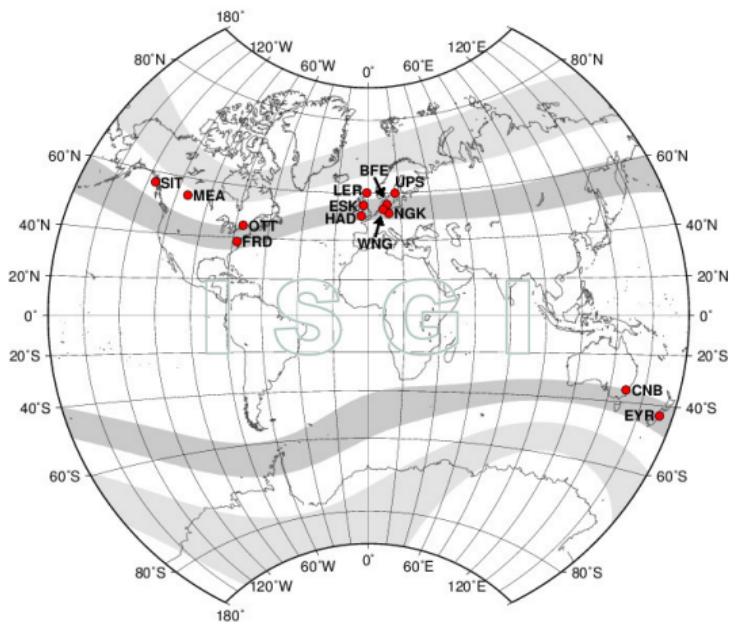
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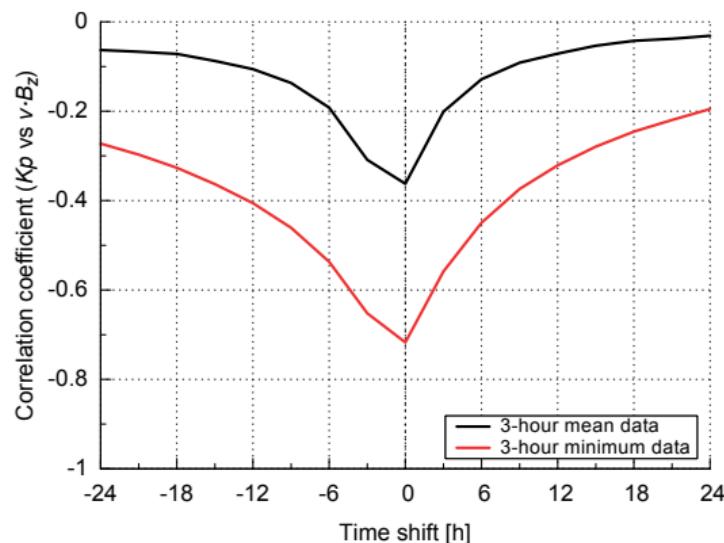
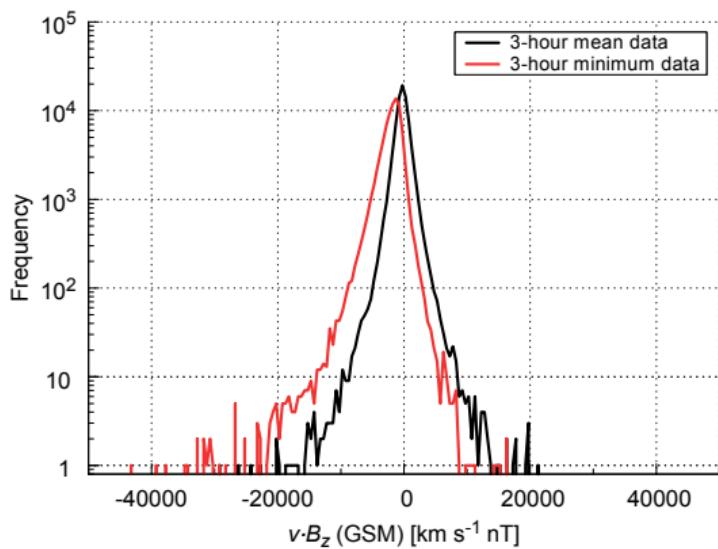
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### Distribution of $K_p$ observatories



Courtesy of International Service of Geomagnetic Indices (ISGI), 2013

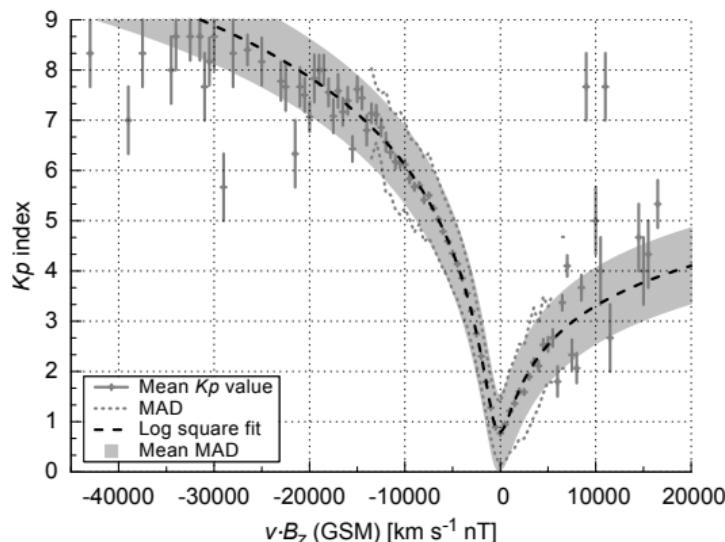
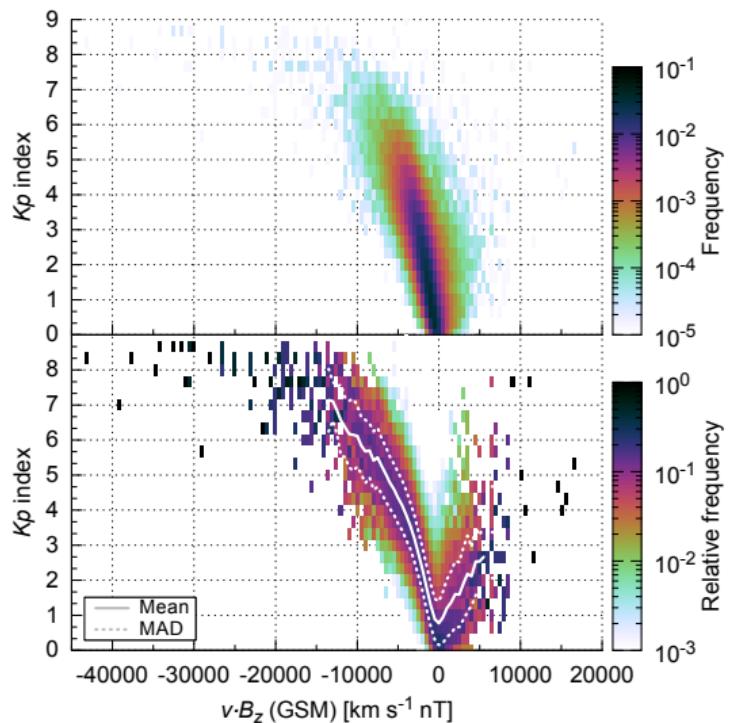


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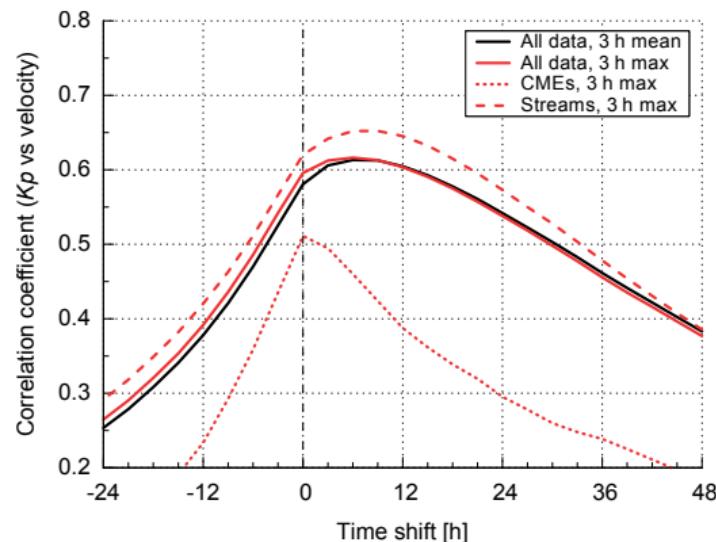
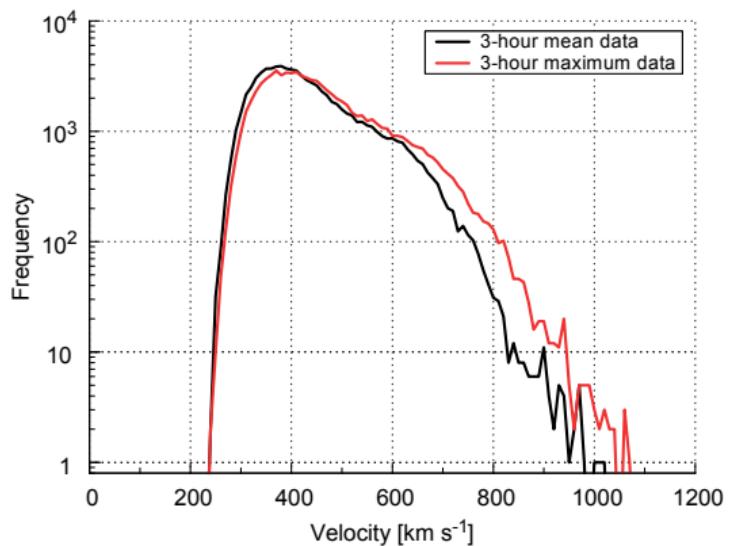


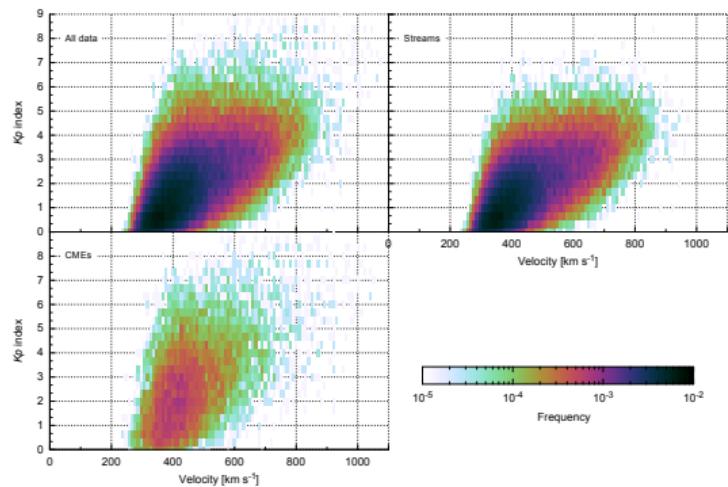
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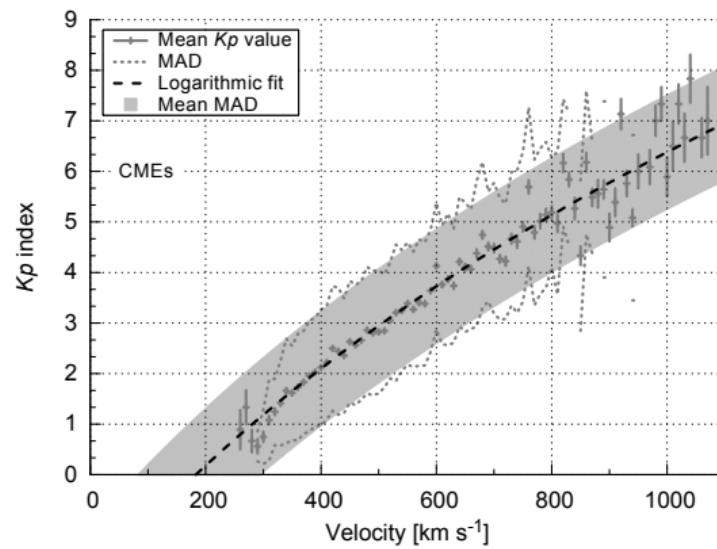
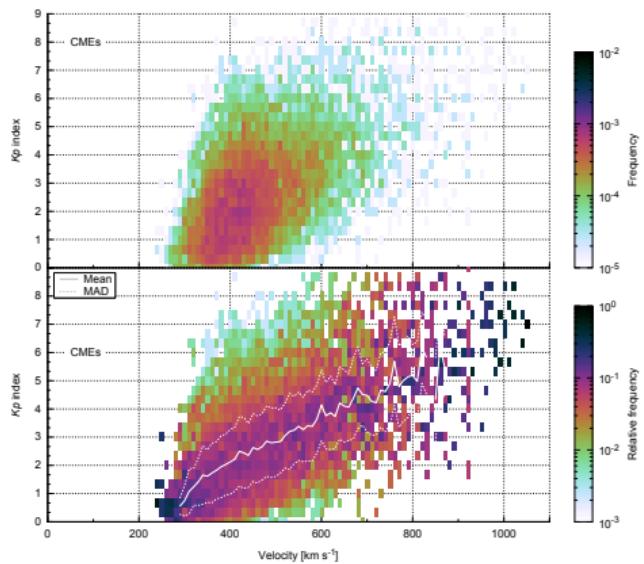


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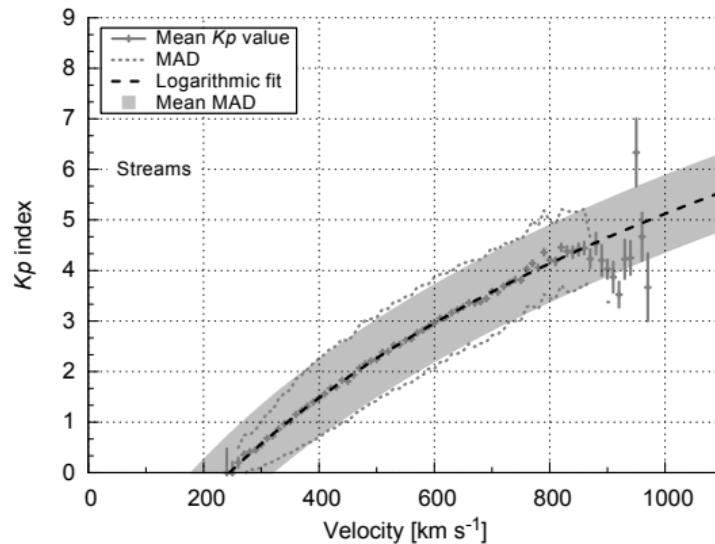
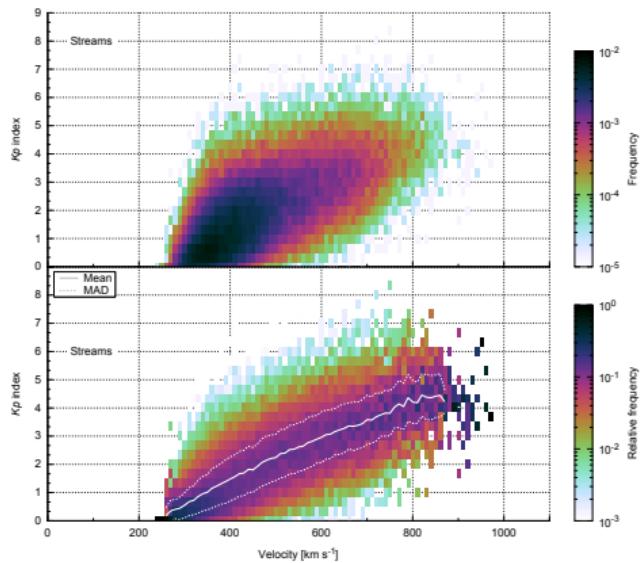


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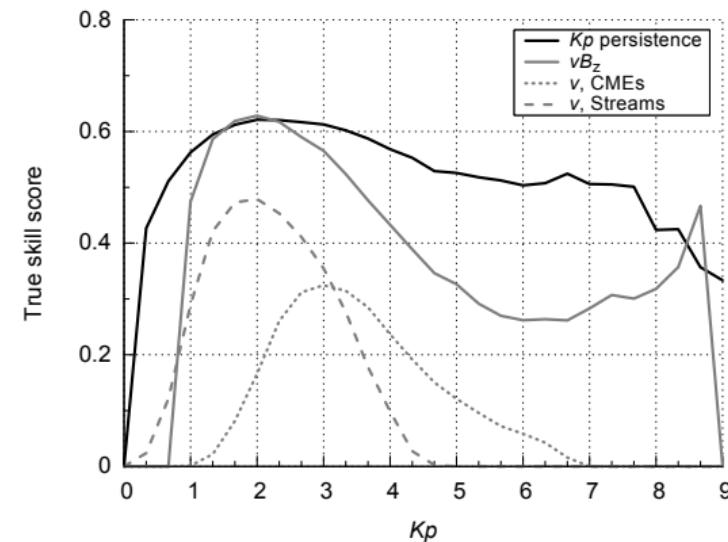
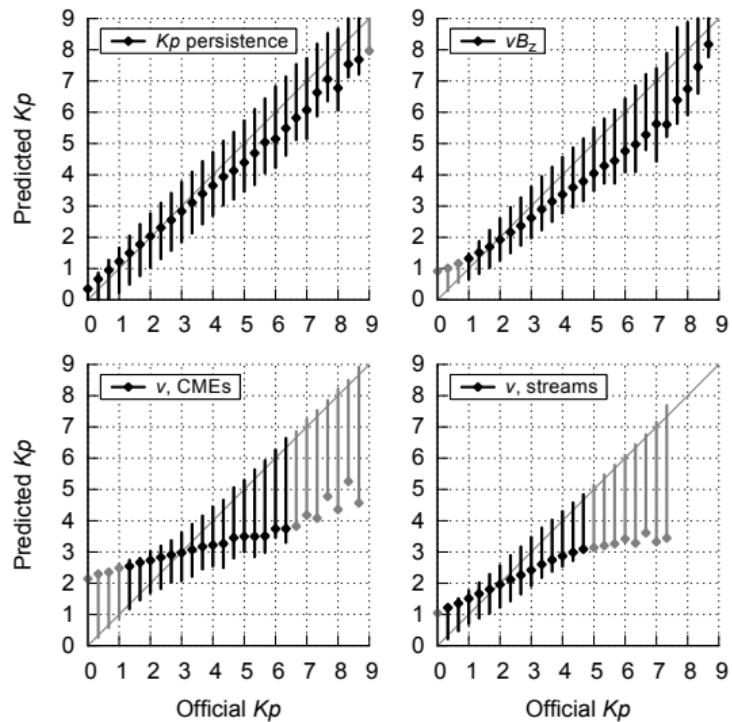


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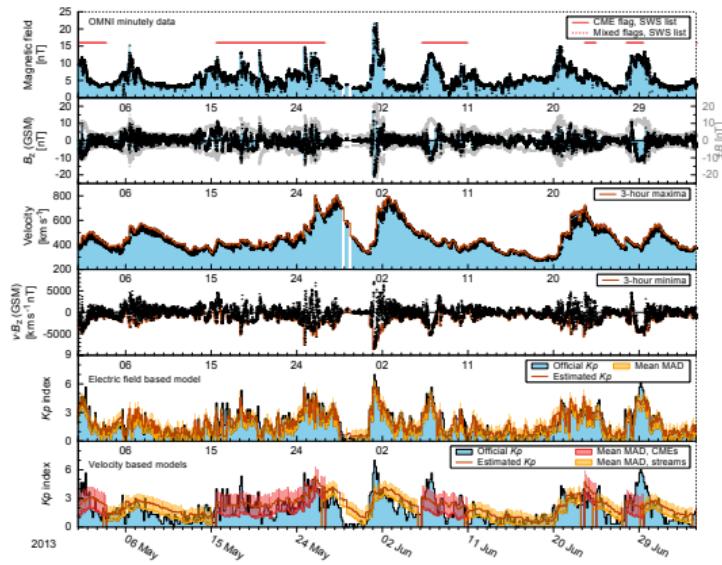


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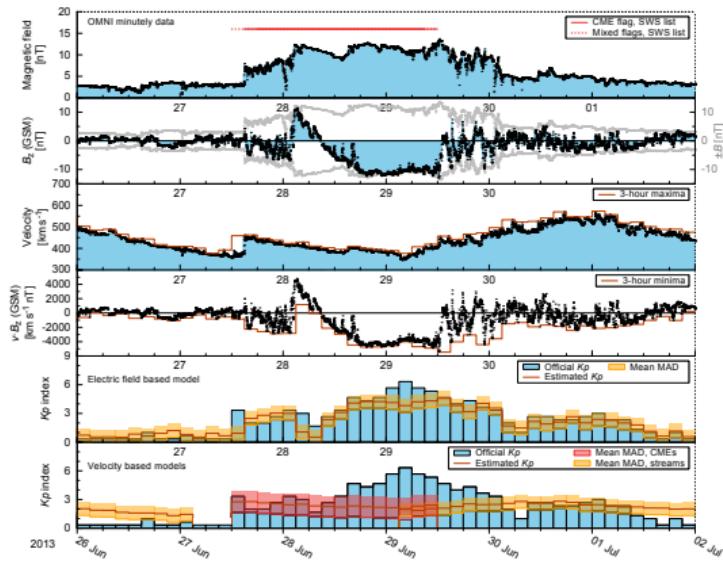


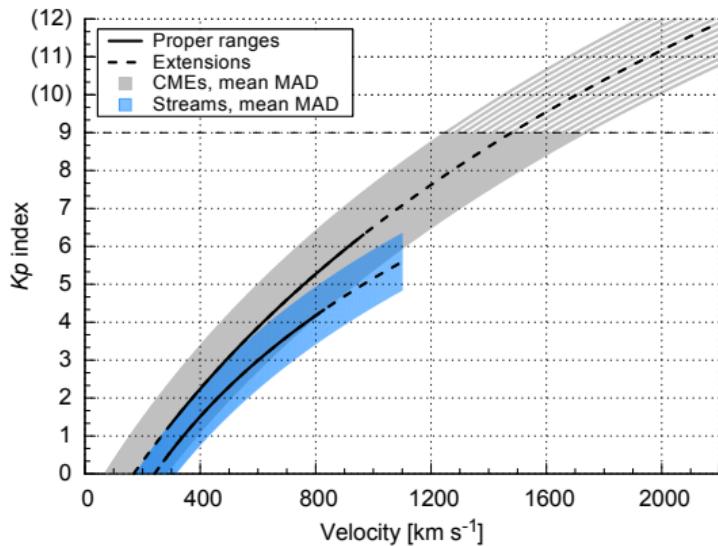
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- 1 Solar wind
- 2 Geomagnetic impact of the solar wind
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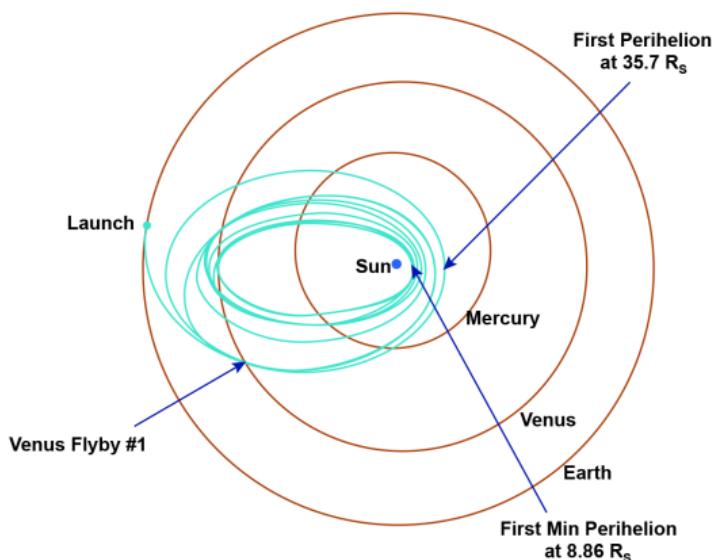
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References

## Sun–Earth evolution of the solar wind

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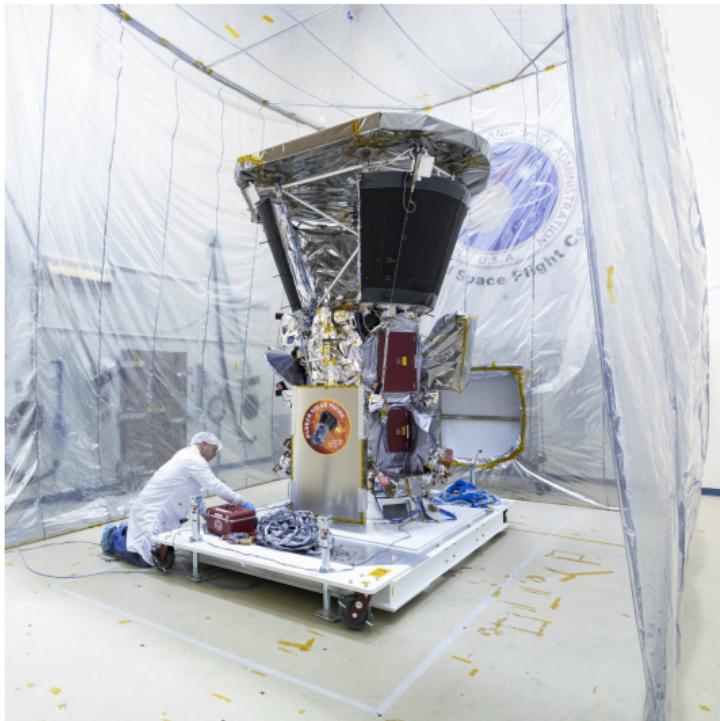
Credit: NASA/Johns Hopkins APL, 2018

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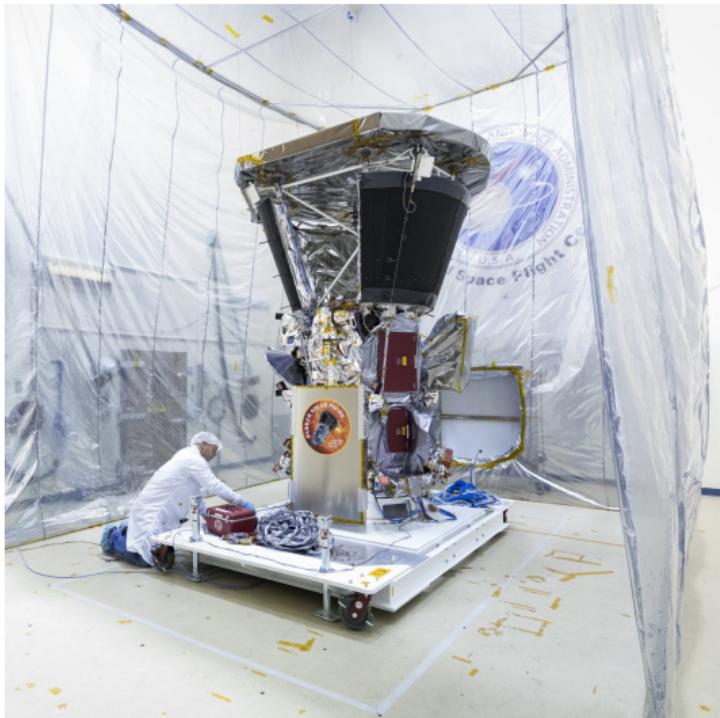
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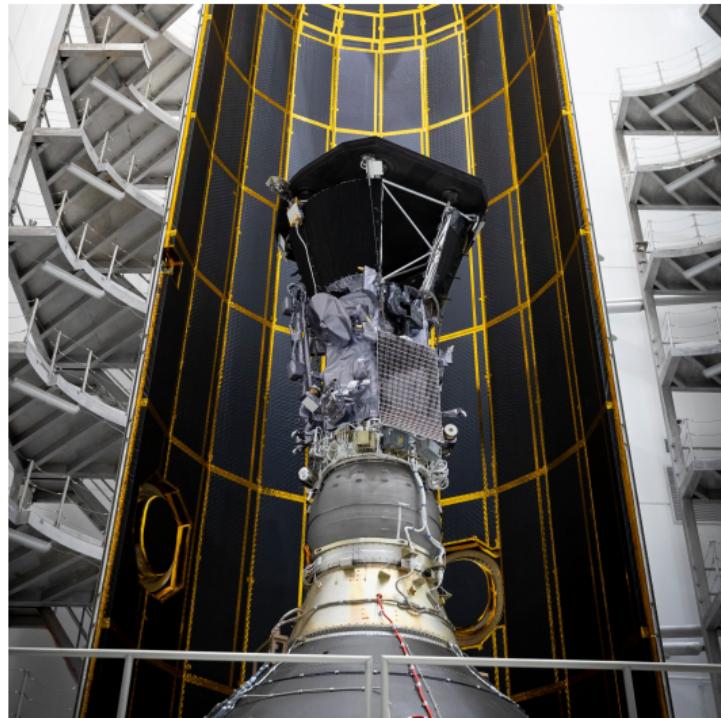
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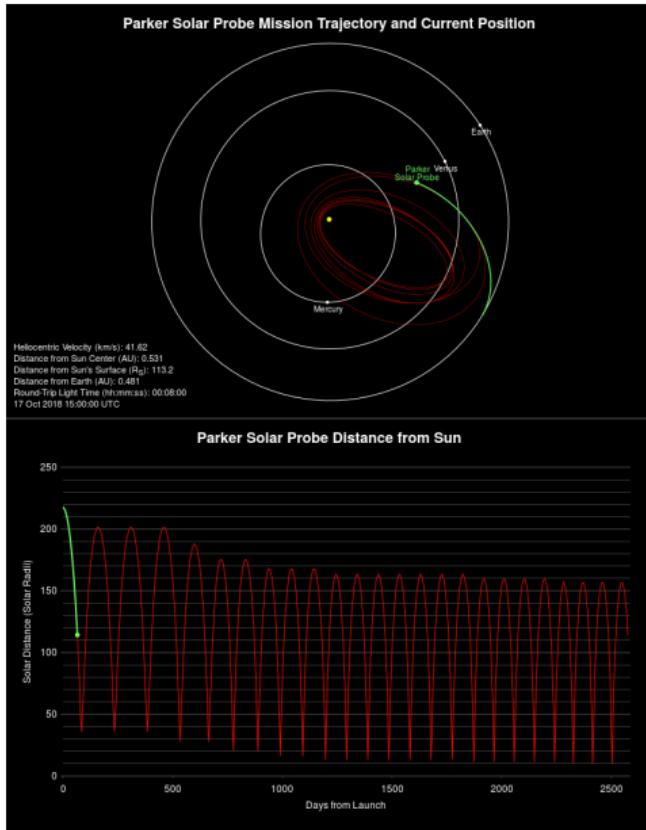
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Credit: NASA/Johns Hopkins APL/Ed Whitman, 2017



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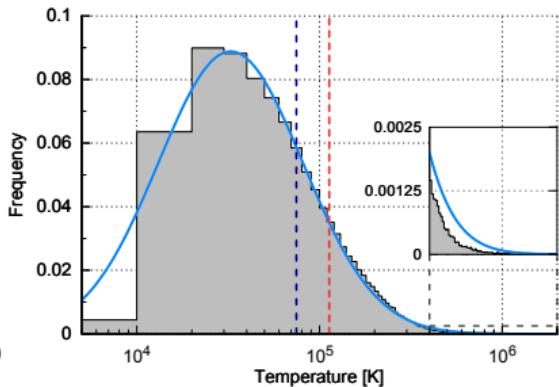
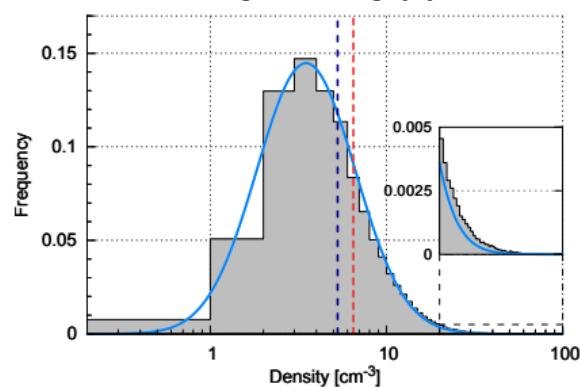
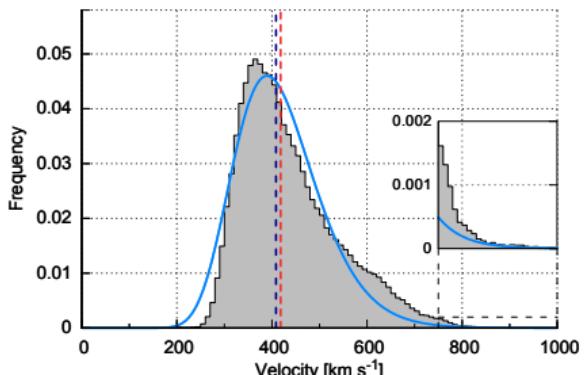
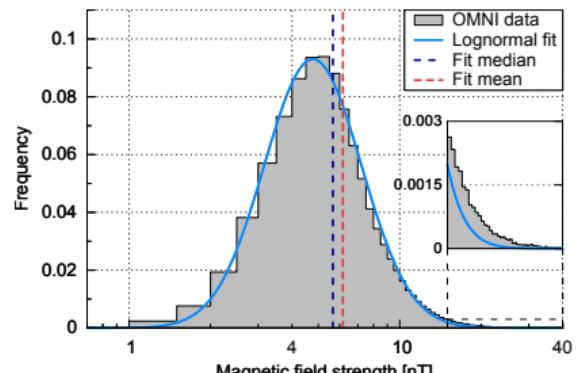
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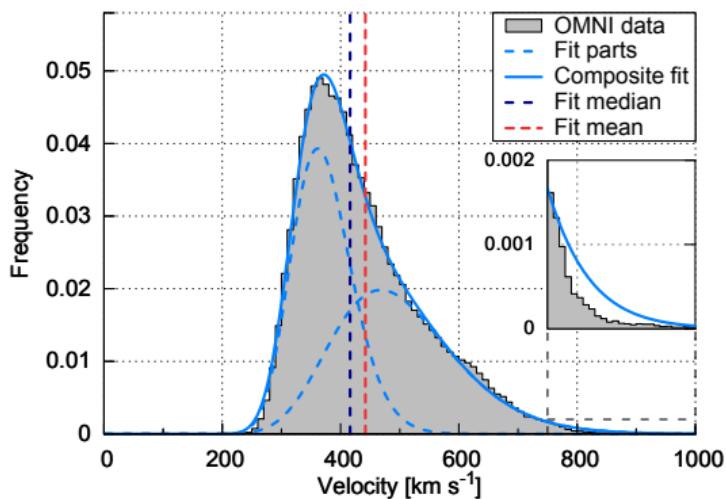
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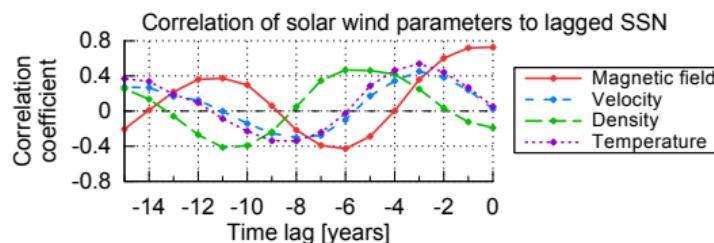
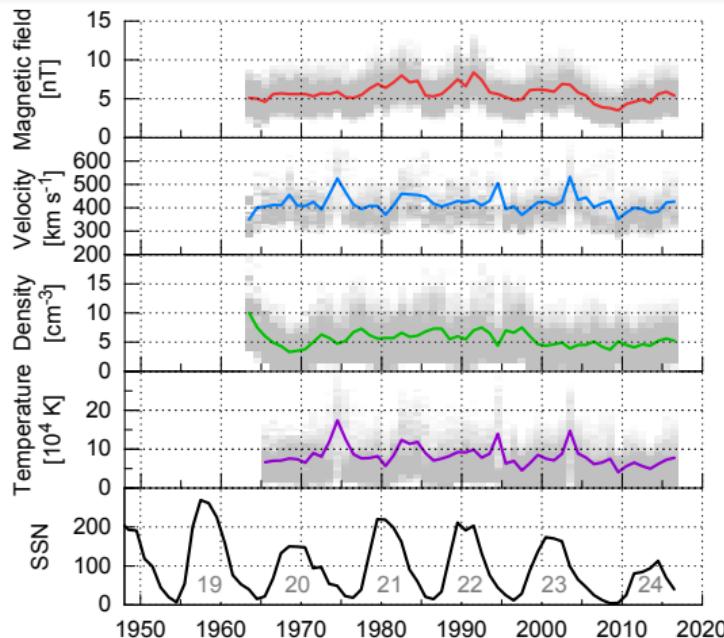


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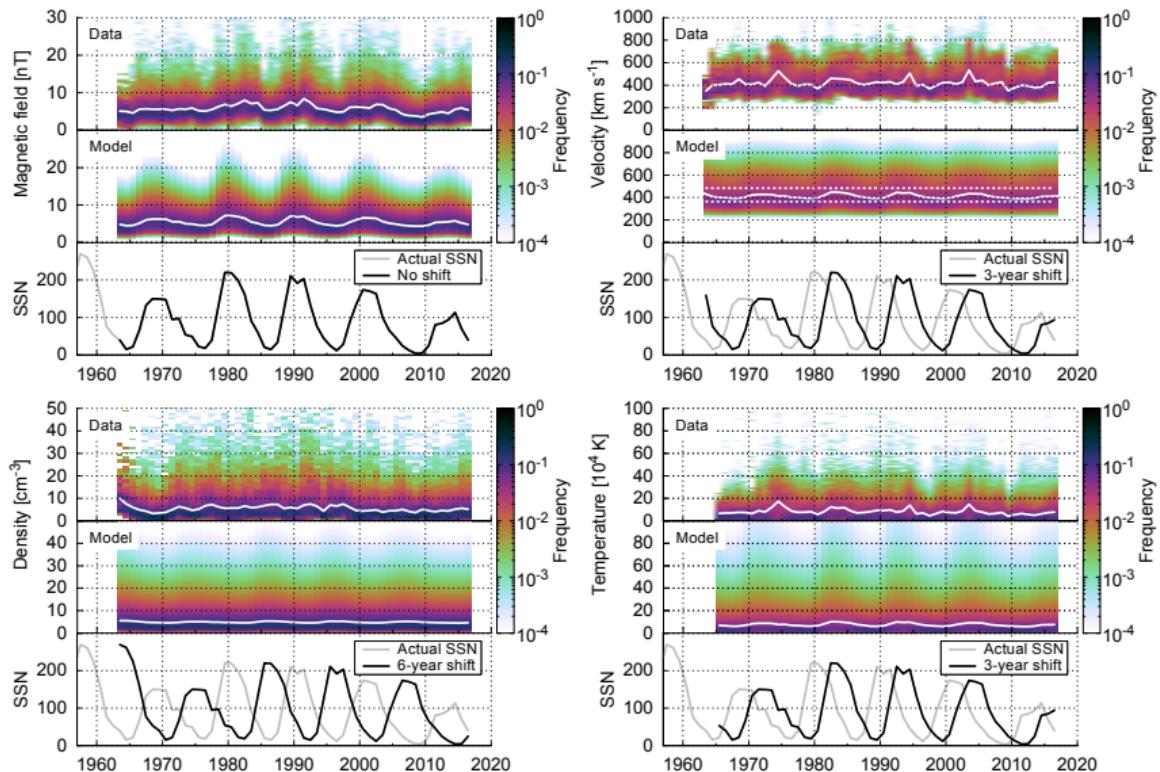


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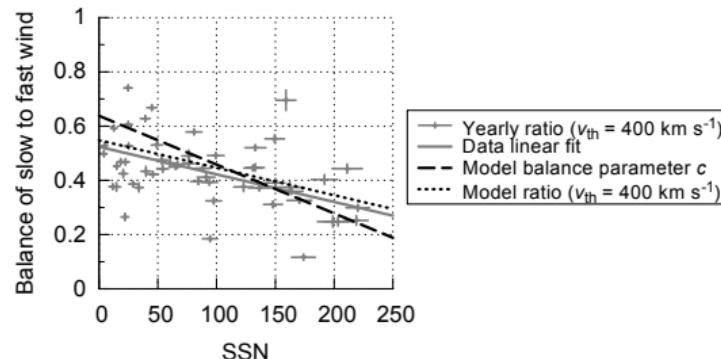
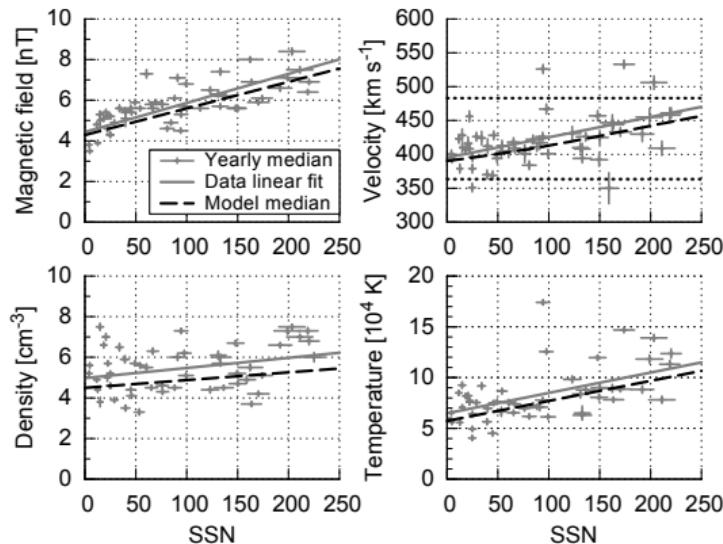


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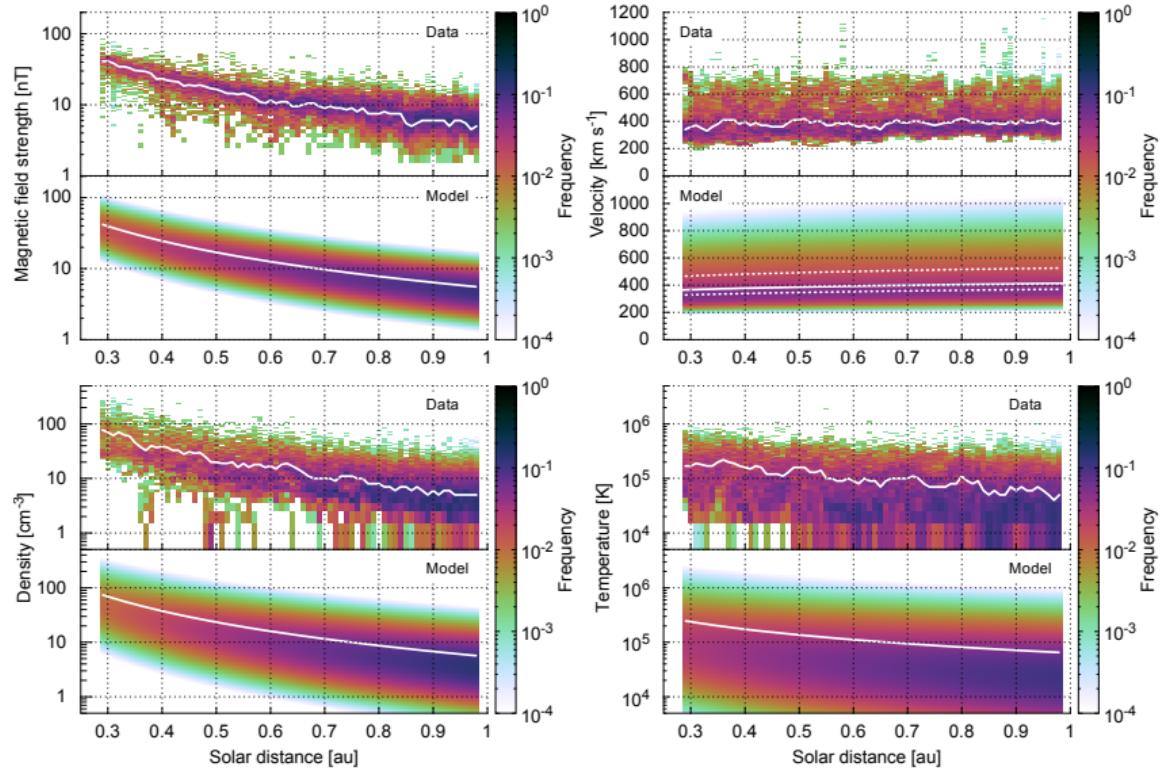


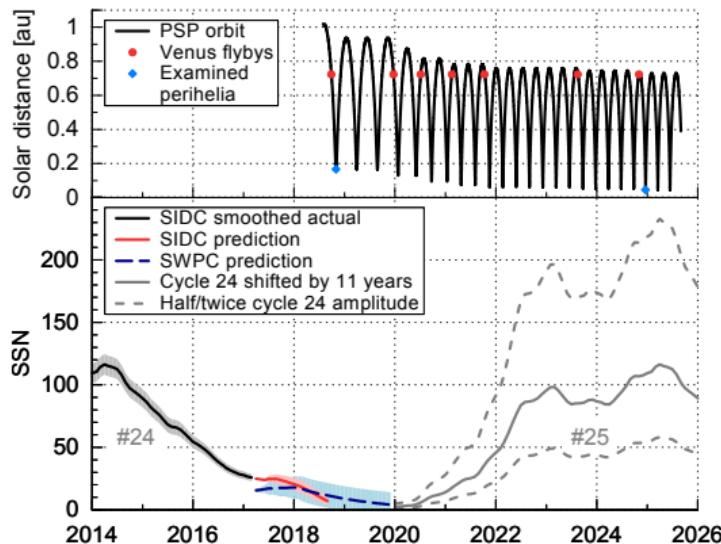
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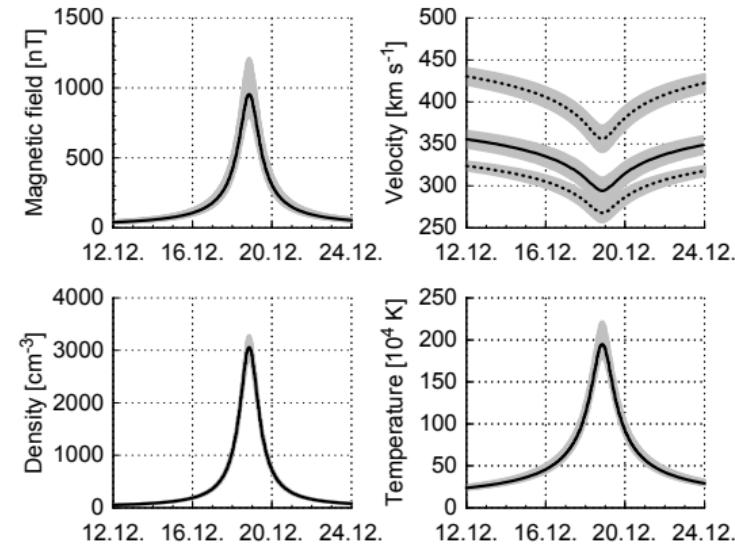
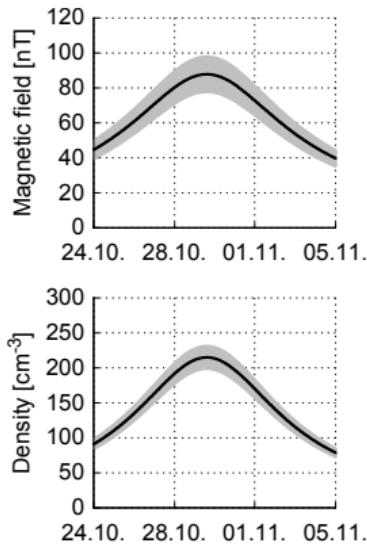


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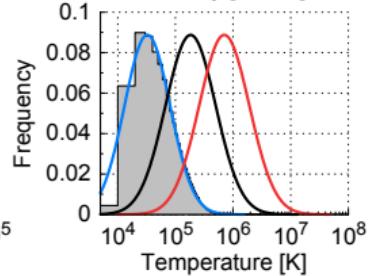
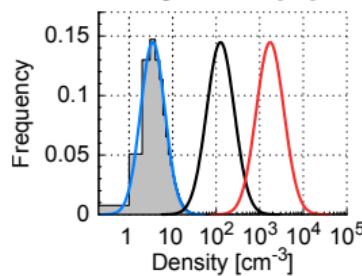
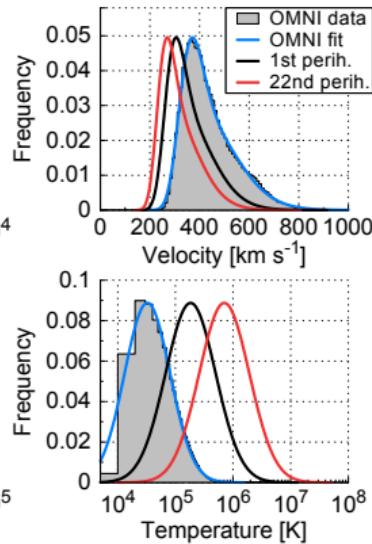
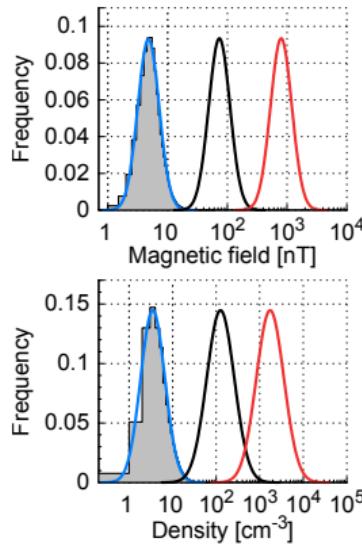


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Solar wind model for the inner heliosphere  
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References

Thank you!

# References |

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4 Backup slides

5 part two

6 part 3

7 Backup slides 2

# first slide

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# first slide

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## Definition

A definition

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4 Backup slides

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7 Backup slides 2

## Sample frame title

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### Examples

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## Sample frame title

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### Remark

Sample text

### Important theorem

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# Sample frame title

In this slide, some important text will be **highlighted** because it's important. Please, don't abuse it.

## Remark

Sample text

## Important theorem

Sample text in red box

## Examples

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4 Backup slides

5 part two

6 part 3

7 Backup slides 2

## Two-column slide

This is a text in first column.

$$E = mc^2$$

- First item
- Second item

This text will be in the second column and on a second thought this is a nice looking layout in some cases (Venzmer & Bothmer, 2018).

# Sample

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## Remark

Sample text

# Sample

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## Remark

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## Important theorem

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4 Backup slides

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