

**WP4: Verifying the kinematic properties of STEREO/HI CMEs
against in-situ CME observations and coronal sources**

In-situ comparison

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The goal of Task 4.2 is to construct a comprehensive catalogue of ICMEs measured *in-situ* and to list their key parameters and the results of modeling based on *in-situ* data.

Relevant HELCTATS catalogs: **DATA CAT** and **ICME CAT**

All data to be made available until end of 2015

Where we are now

DATACAT

- In-situ data of plasma and magnetic fields starting from January 2007. All in same format IDL sav.-files
- Venus Express, MESSENGER, Ulysses (UNIGRAZ), STEREO, WIND (UH)

ICMECAT

- Clear ICMEs and magnetic flux ropes (MFR) (MESSENGER and VEX more strict as based only on magnetic field measurement)
- Around 1 AU (Wind, STEREO): 435 ICMEs
- Inner heliosphere (MESSENGER, VEX): 167 ICMEs

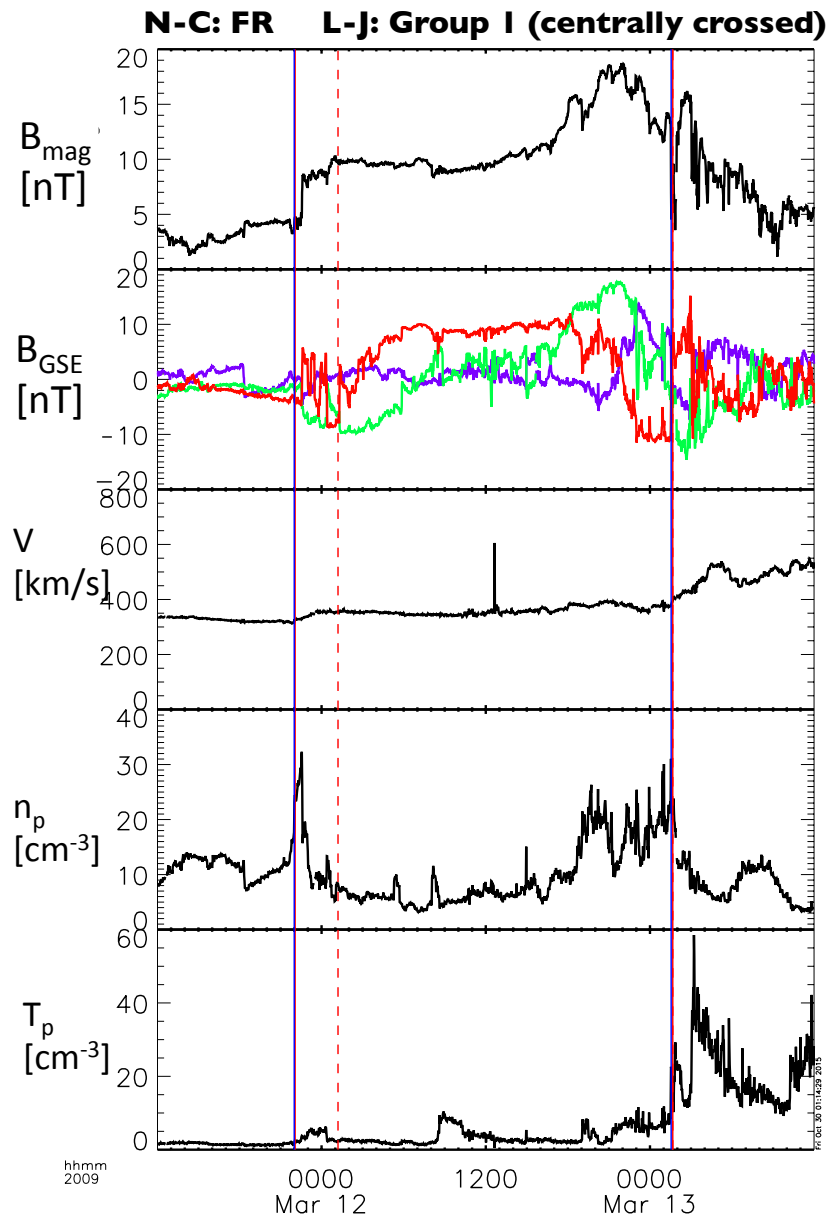
} 602 ICMEs

Spacecraft	Provider	Number of ICMEs	Start time	End time
Wind	T. Nieves-Chinchilla	135	Jan 2007	Dec 2013
STEREO-A	L. Jian	167	Jan 2007	Jun 2014
STEREO-B	L. Jian	133	Jan 2007	Dec 2013
VEX	S. Good	81	Jan 2007	Dec 2013
MESSENGER	S. Good	33	Jan 2007	May 2012
	R. Winslow	61	May 2011	Sep 2014

Shocks

e.g., UH Heliospheric shock database

Comparison of Nieves and Chinchilla (N-C) and Lan Jian (L-J) lists (WIND)



Line	Source	structure
blue solid	L-J	ICME
blue dashed	L-J	Obstacle (start)
red solid	N-C	ICME
red dashed	N-C	Obstacle

N-C list

ICME (solid)

Start: shock or sheath signatures

End: Reverse shock or end of magnetic obstacle

Magnetic Obstacle (dashed)

Characterized as flux rope (FR, rotation), flux rope like (FRL, partial rotation), Ejecta (no rotation)

L-J list

ICME (solid)

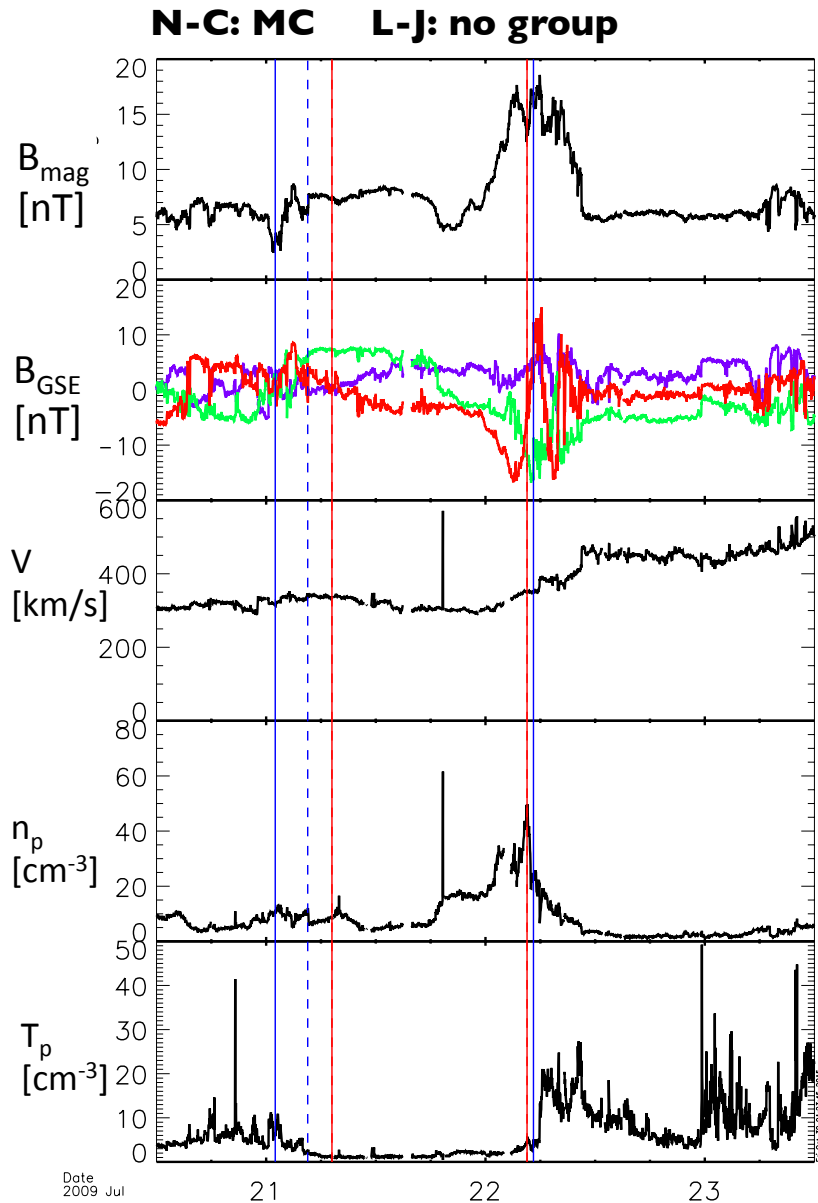
Start: Based on various signatures (Pt)

End: Based on various signatures (Pt)

Magnetic Obstacle (dashed)

End time same as for ICME. Start

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End: Based on various signatures (Pt)

Magnetic Obstacle (dashed)

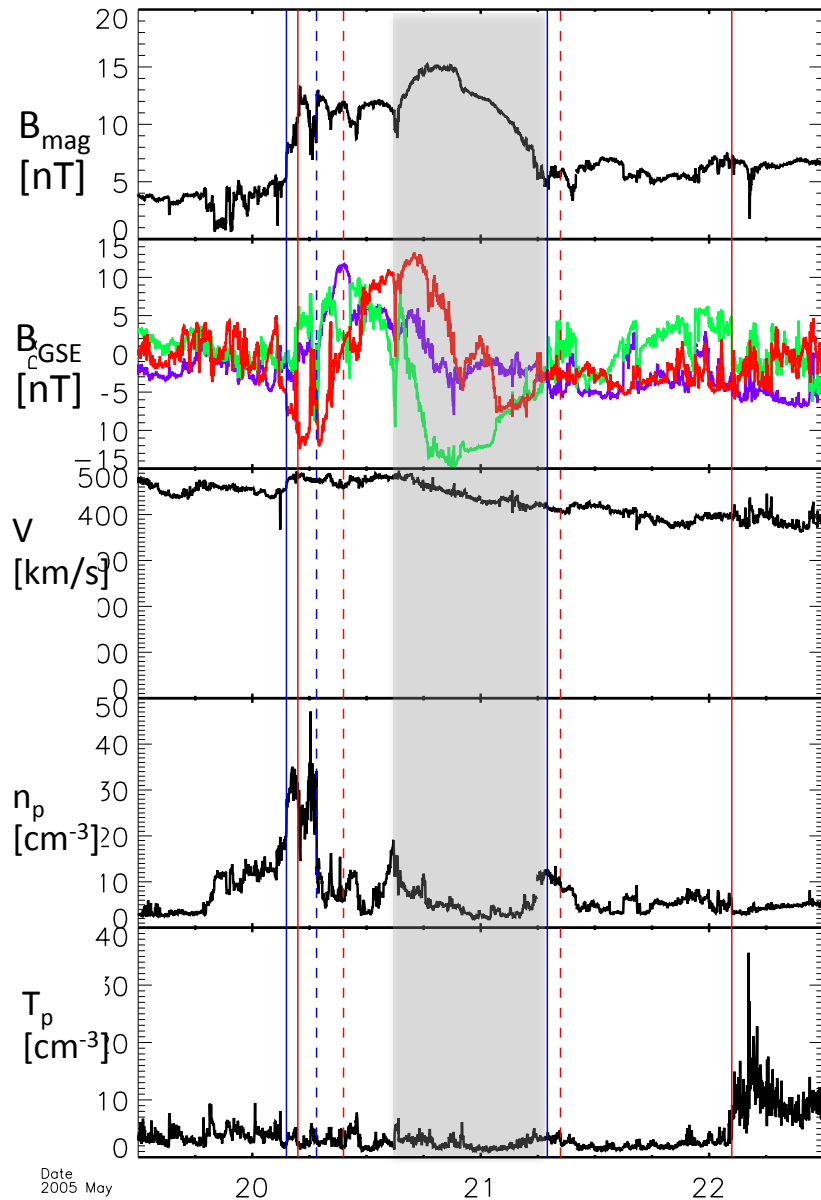
End time same as for ICME. Start

→ magnetic obstacle times for MVA and input to GS

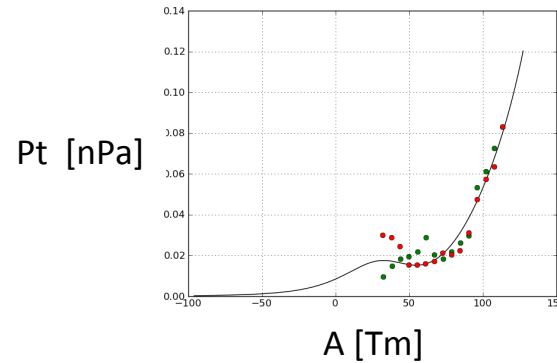
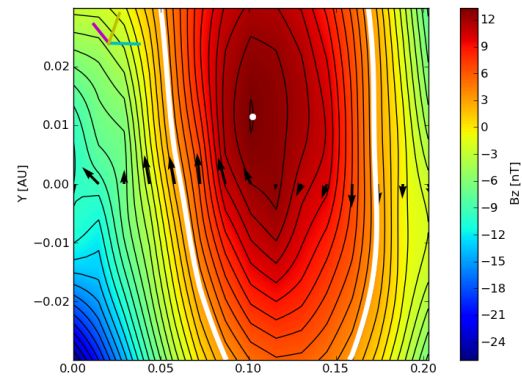
→ ICME – obstacle start times: Sheath values

Comparison of Nieves and Chinchilla (N-C) and Lan Jian (L-J) lists (WIND)

N-C: FR L-J: Group I (centrally crossed)



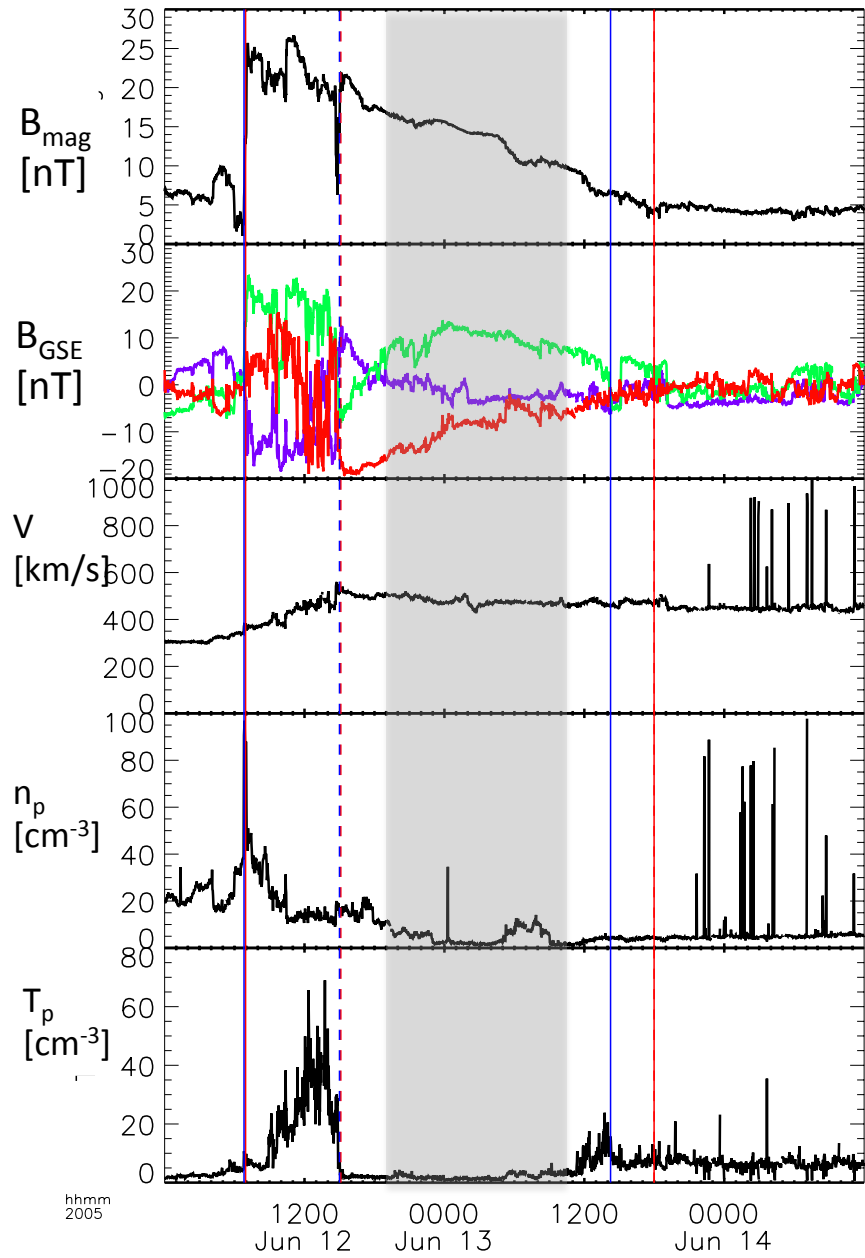
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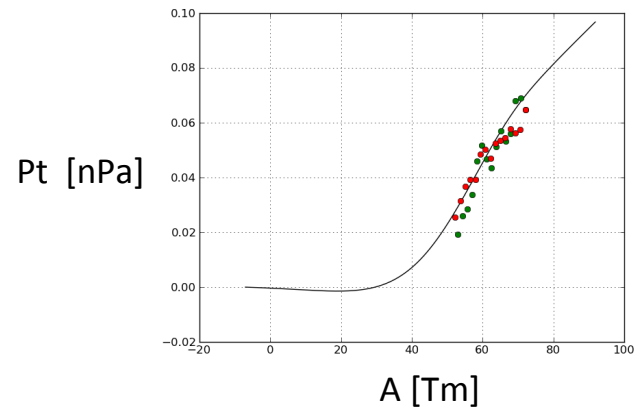
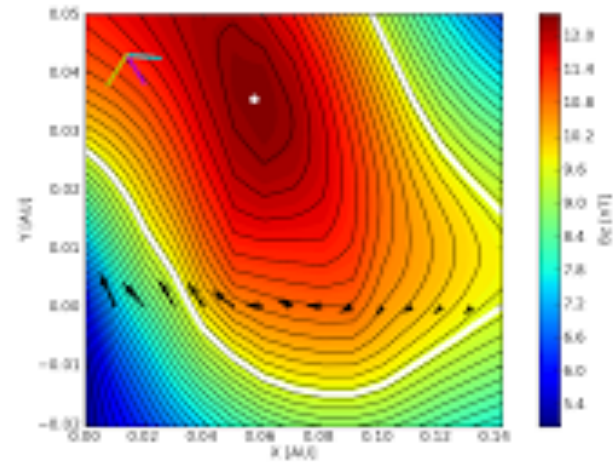
- Orientation
- Helicity
- Closes approach distance
- (V, B, n_p max etc.) automated

Details: Kilpua et al., 2013: <http://adsabs.harvard.edu/abs/2013AnGeo..31.1251K>

N-C: FRL L-J: Group 3 (edge encounter)



Line	Source	structure
blue solid	L-J	ICME
blue dashed	L-J	Obstacle (start)
red solid	N-C	ICME
red dashed	N-C	Obstacle



EGU 2016 Session:

ST1.7

Insights for Early Predictions of Magnetic and Dynamic Properties of Interplanetary Coronal Mass Ejections using Observations, Theory and Modeling

Convener: Emilia Kilpua

Co-Conveners: N. P. Savani, Spiros Patsourakos

