National and Kapodistrian
University of Athens

The ARTEMIS-IV/JLS free access database (ARTDB)

Off to a Good Start - With Room for Improvement

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2025 NMDB meeting Athens March 19-21

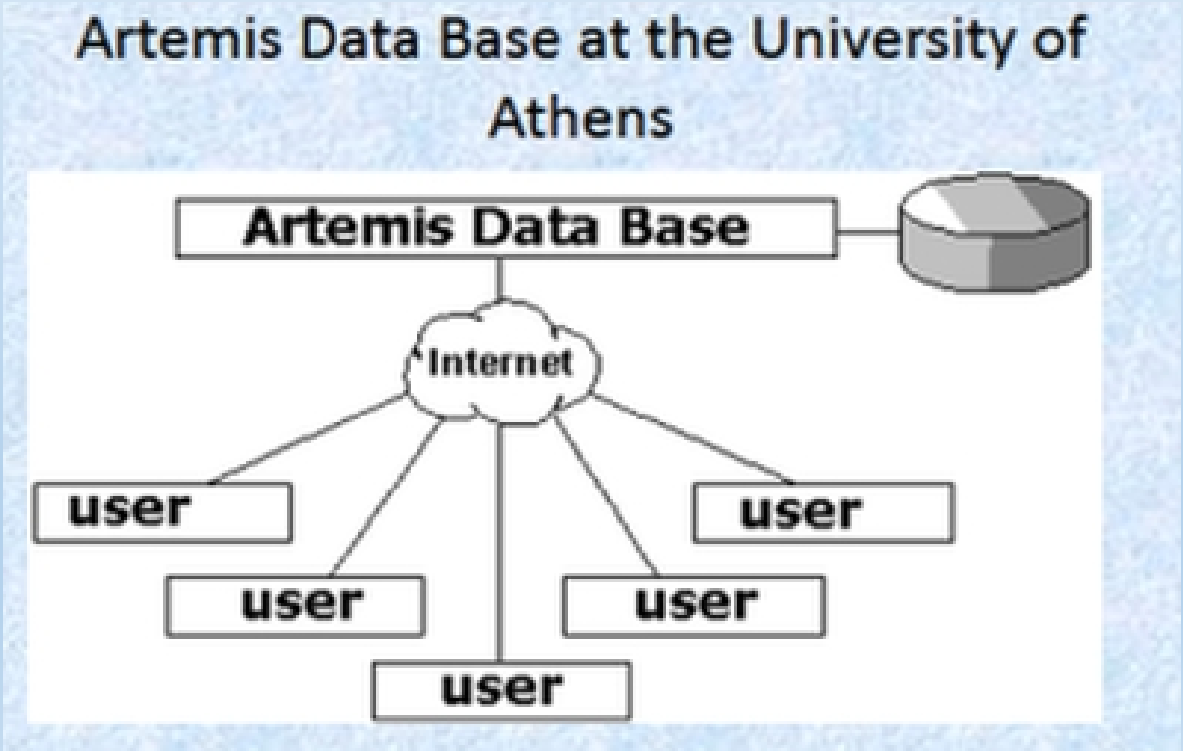
Outline of the Talk: What's Working & What Needs Work

- Introduction
- The ARTEMIS-IV/JLS Instrument -Time & Frequency sampling
- Access & Data Formats - Downloading
- Gallery – Examples
- Room for improvement

➢ ARTEMIS-IV/JLS: Introduction

Open data is essential in solar and space physics, facilitating collaboration and the integration of diverse observational datasets. This promotes cooperation and the synthesis of complementary datasets.

To support this effort, the ARTEMIS Jean Louis Steinberg (ARTEMIS-IV) Multichannel Radiospectrograph Online Database was developed for free data access.



This initiative was co-financed by the **Onassis Foundation** (Grant 15153) and the **University of Athens Research Committee** (Grant, 15018).

➢ ARTEMIS-IV/JLS: Instrument -Time & Frequency sampling

- ✓ Location: Thermopylae, 38° 49′N, 22° 41′E
- ✓ Frequency range: 110-687 MHz (1996-2002) extended hence to 20-650 MHz
- ✓ Daily observations: 05:30 - 15:00 UT
- ✓ Two antennas
- ✓ Two receivers
  - Global Spectral Analyzer (ASG): 650–20 MHz, 10 samples/sec, 630 Channels, 500 MB
  - Acousto-Optic Spectrograph (SAO): 270-450 MHz, 100 samples/sec, 128 Channels, 900 MB
- ✓ Total data volume: ~1.5 GBytes/Day.

(Caroubalos et al., 2001; Kontogeorgos et al., 2006)

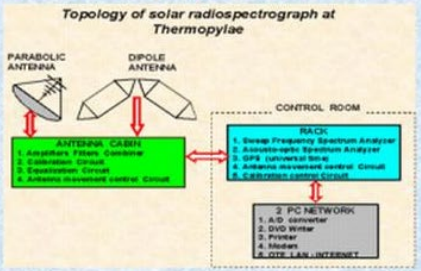
➢ ARTEMIS-IV/JLS: Access & Data Downloading

http://artemis-iv.phys.uoa.gr

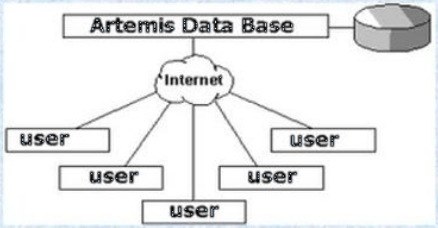
ARTEMIS/JLS (ARTEMIS-IV) HOME

PHYS224 Lectures

The ARTEMIS–Jean Louis Steinberg (ARTEMIS-IV) Multi-channel Solar Radio Spectrograph of the University Of Athens



Artemis Data Base at the University of Athens



Supported by the Onassis Foundation, Grant 15153,Project ARBM (Artemis Data Base Maintenance), and the University of Athens Research Committee, Grant 15018.

ONASSIS FOUNDATION

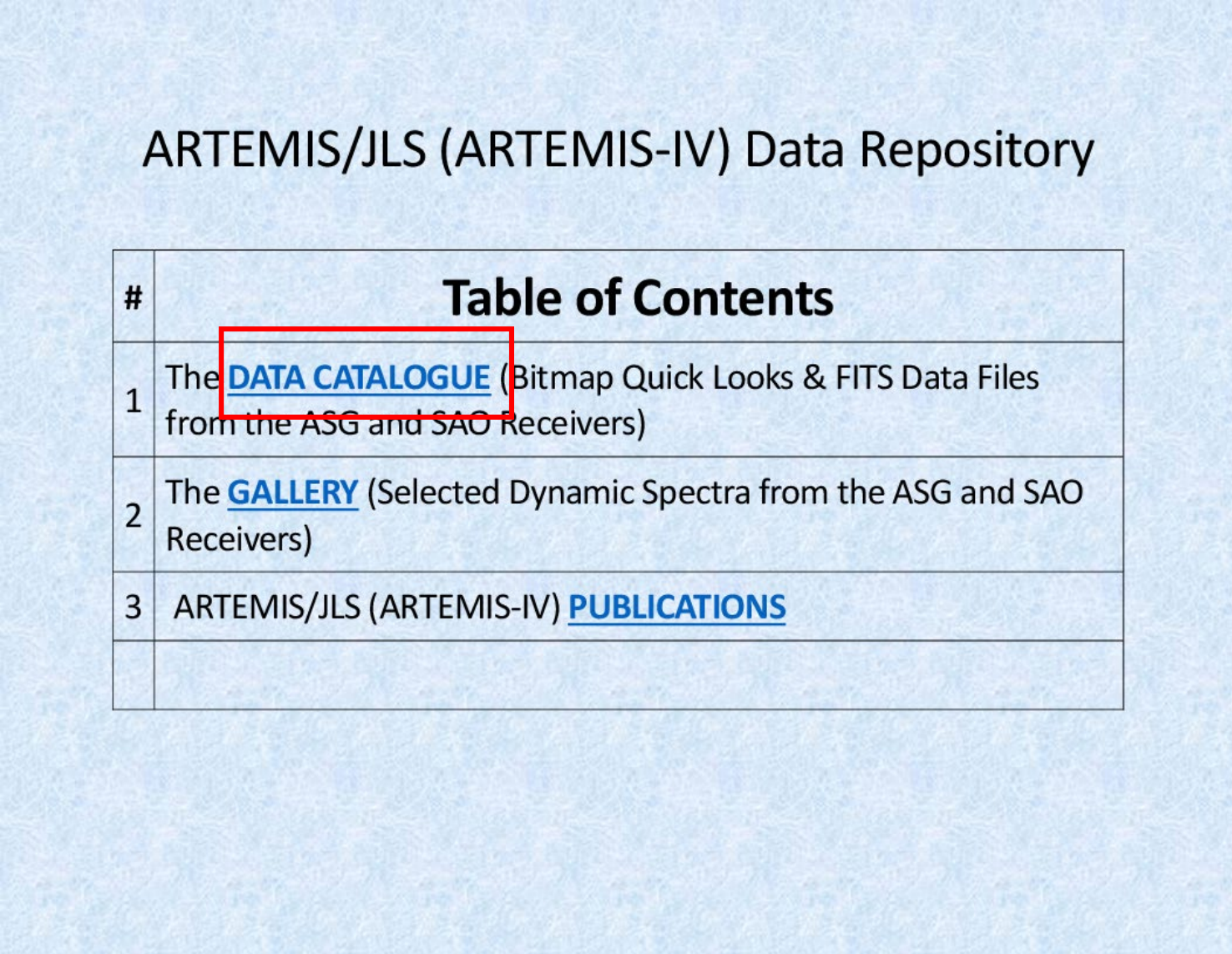
Data Repository of the ARTEMIS-Jean Louis Steinberg Multichannel Radiospectrograph of the University of ATHENS: **Table of Contents**

➢ARTEMIS-IV/JLS: Access & Data Downloading

DVDs:
1 week data for ASG
4 days data for SAO

2 years
Portable means of storage*
to
ARTDB:

*very few tracks after so many years appeared data errors



➢ARTEMIS-IV/JLS: Access & Data Downloading

The *ARTEMIS-IV\JLS* free access database (ARTDB)

The ARTEMIS–Jean Louis Steinberg Radiospectrograph (ARTEMIS-IV)
DATA CATALOGUE

YEAR	MONTH											
1998	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1999	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2003	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2005	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Click on month to get the list of Dynamic Spectra for that month
Entries in RED are DATA GAPS for the duration of the corresponding Month

When using data from this catalogue in published papers please consider citing one or more of the following:

«*Observing the Sun At 20-650Mhz at Thermopylae with Artemis*» Space Science Reviews **122**: 169-179 (2006)

«*The improved ARTEMIS IV multichannel solar radio spectrograph of the University of Athens*».: Experimental Astronomy (2006) **21**:41-55

«*Measuring solar radio bursts in 20-650 MHz*», Measurement, **41**, (2008), 251-258.

Index of /ARTEMIS/QuickLooks/2003/11

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03B01.ACT.Dif02.BMP	2020-09-13 09:54	1.3M	
03B01.ACT.Dif03.BMP	2020-09-13 09:54	223K	
03B01.ACT.FLX	2020-09-13 09:54	505K	
03B01.ACT.INT.DAT	2020-09-13 09:54	4.1M	
03B01.ACT.INT.FITS	2020-09-13 09:54	4.1M	
03B01.ACT.Int01.BMP	2020-09-13 09:54	1.3M	
03B01.ACT.Int02.BMP	2020-09-13 09:54	1.3M	
03B01.ACT.Int03.BMP	2020-09-13 09:54	223K	
03B01.ACT.OUT	2020-09-13 09:54	53K	
03B01_00.ASG.Dif01.BMP	2020-09-13 09:20	1.3M	
03B01_00.ASG.Dif02.BMP	2020-09-13 09:20	445K	
03B01_00.ASG.FLX	2020-09-13 09:20	328K	
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03B01_00.ASG.Int02.BMP	2020-09-13 09:20	445K	
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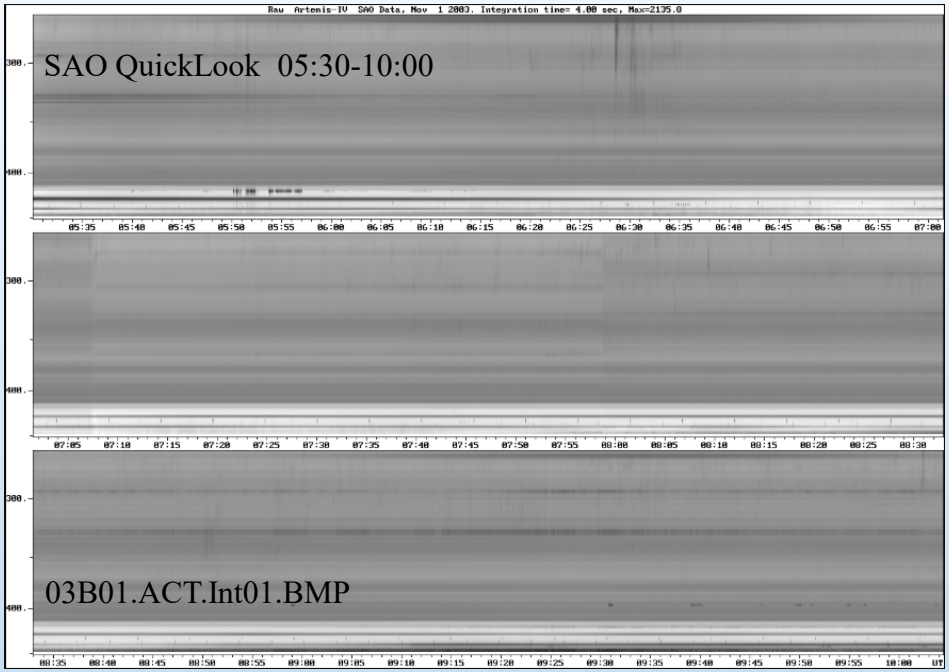
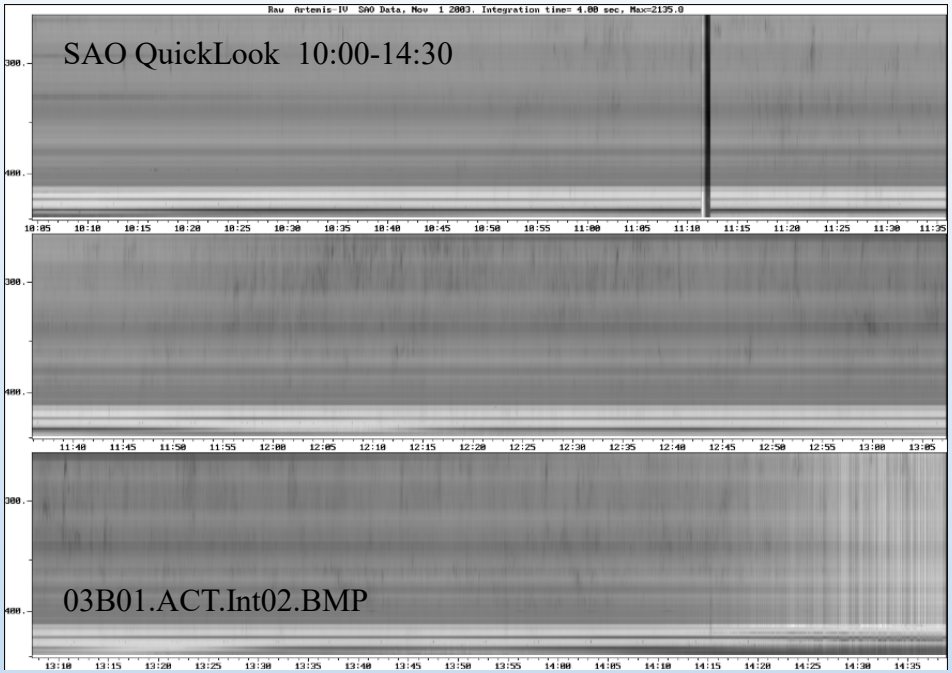
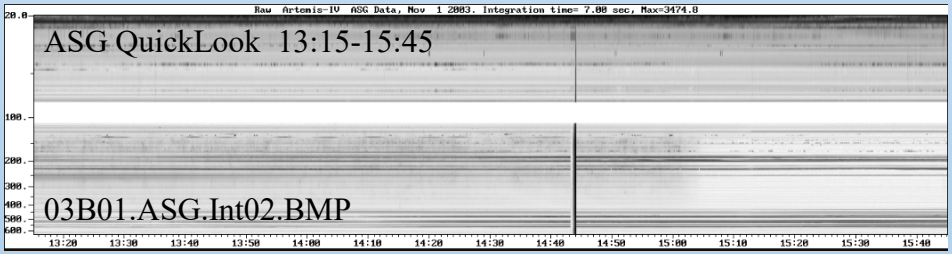
➢ARTEMIS-IV/JLS: Access & Data Downloading

The *ARTEMIS-IV\JLS* free access database (ARTDB)







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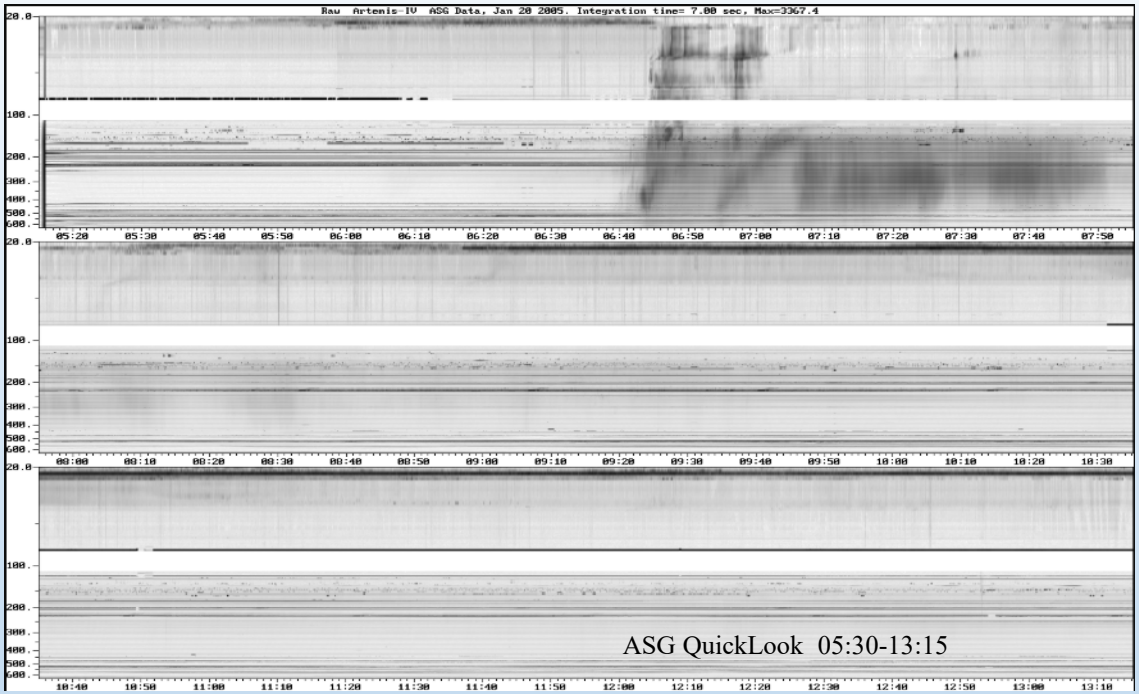
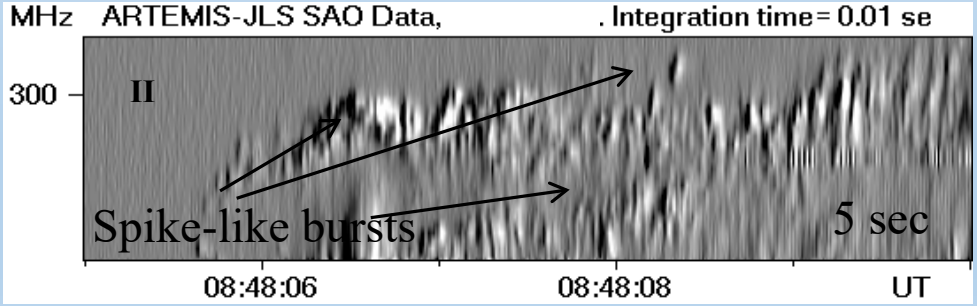
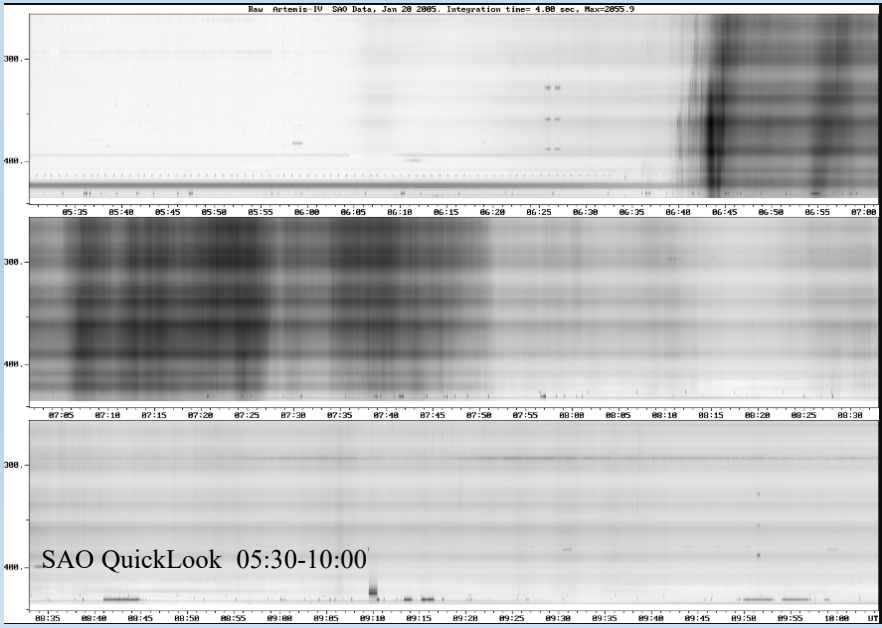
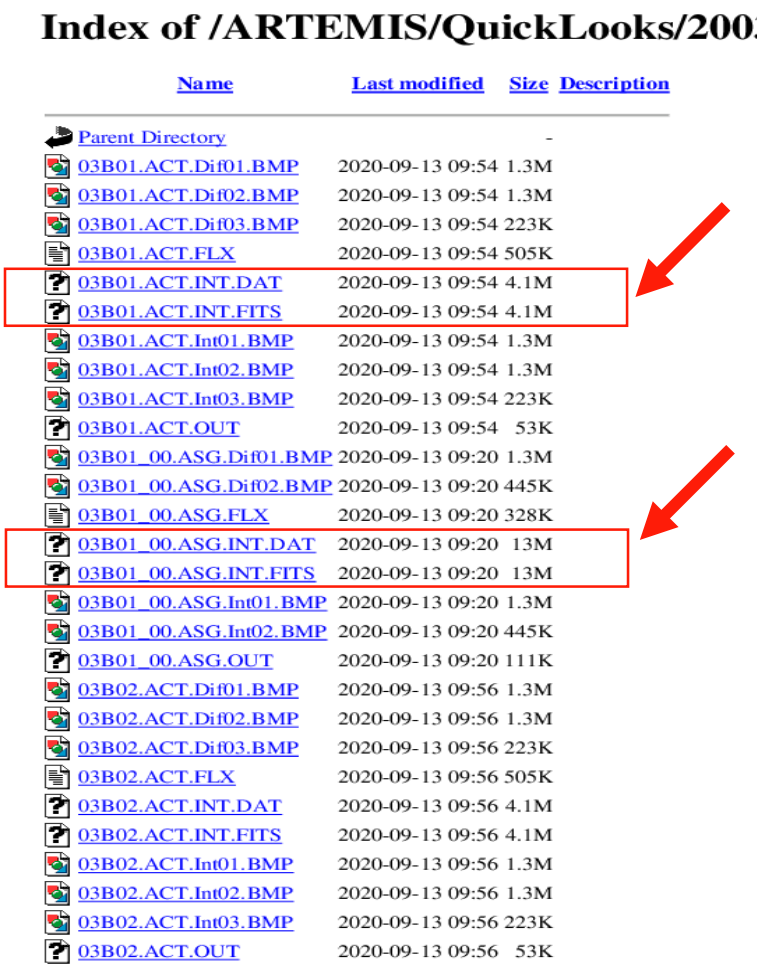






2025 NMDB meeting Athens March 19-21

➢ARTEMIS-IV/JLS: Access & Data Downloading



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03B01.ACT.FLX	2020-09-13 09:54	505K	
03B01.ACT.INT.DAT	2020-09-13 09:54	4.1M	
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03B01.ACT.Int01.BMP	2020-09-13 09:54	1.3M	
03B01.ACT.Int02.BMP	2020-09-13 09:54	1.3M	
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03B02.ACT.Int02.BMP	2020-09-13 09:56	1.3M	
03B02.ACT.Int03.BMP	2020-09-13 09:56	223K	
03B02.ACT.OUT	2020-09-13 09:56	53K	

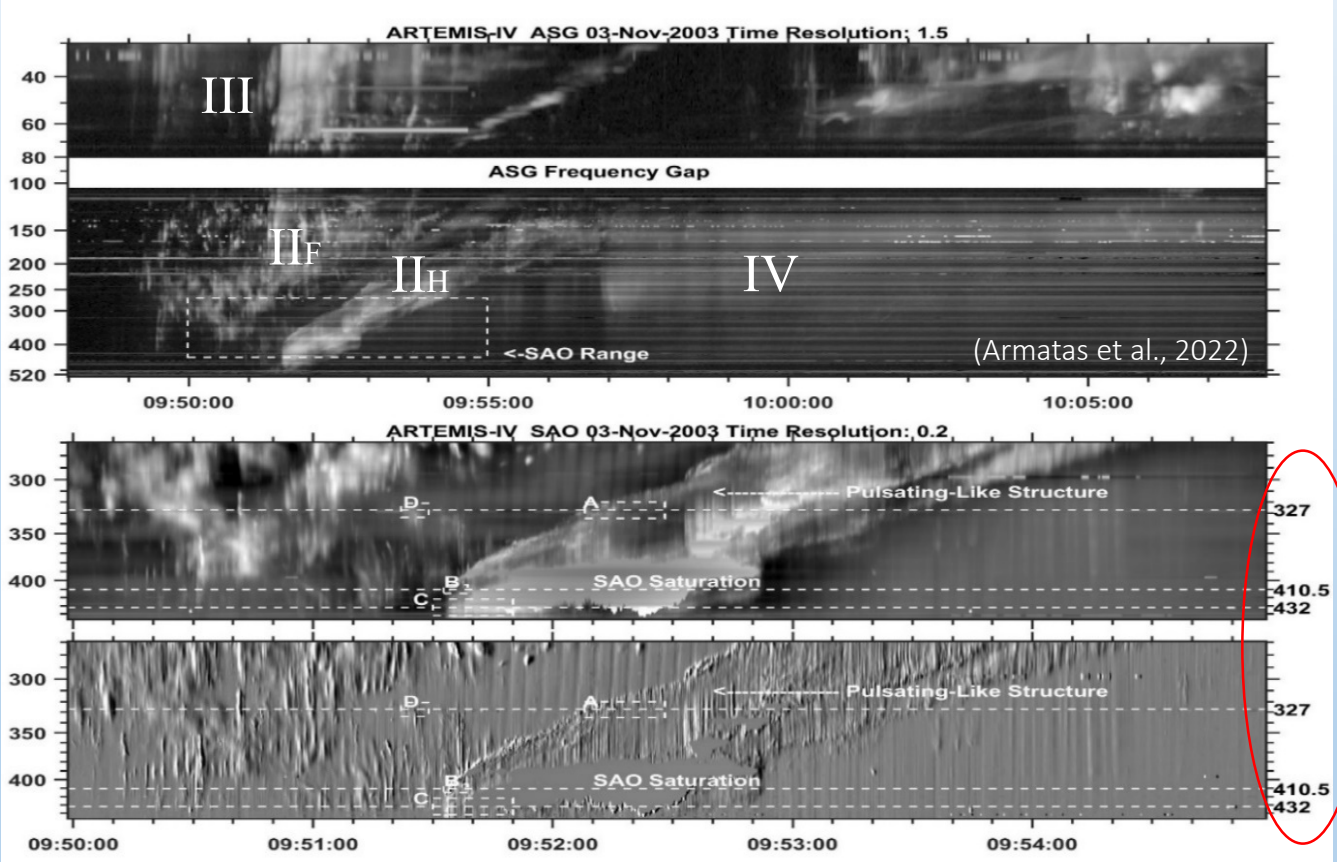
Download:

03B01.ACT.INT.FITS

03B01_00.ASG.INT.FITS

➢ ARTEMIS-IV/JLS: Use of Downloaded data

- ✓ Examine Quicklooks
- ✓ Download Bitmap images of spectra
- ✓ Download Fits or DAT files (both ASG/SAO receiver)

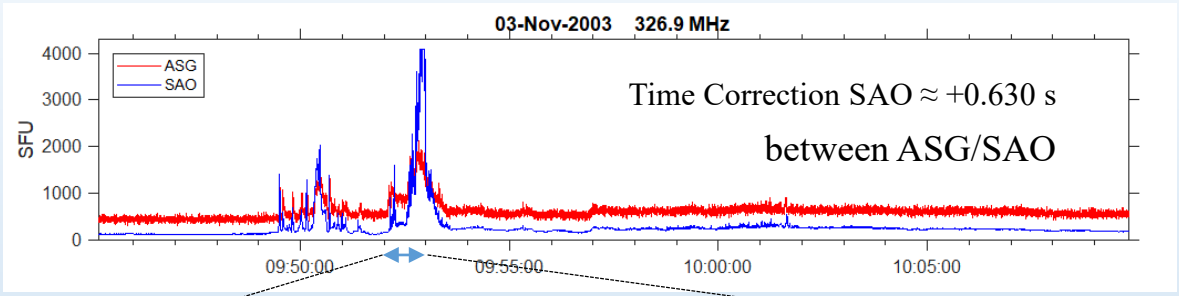


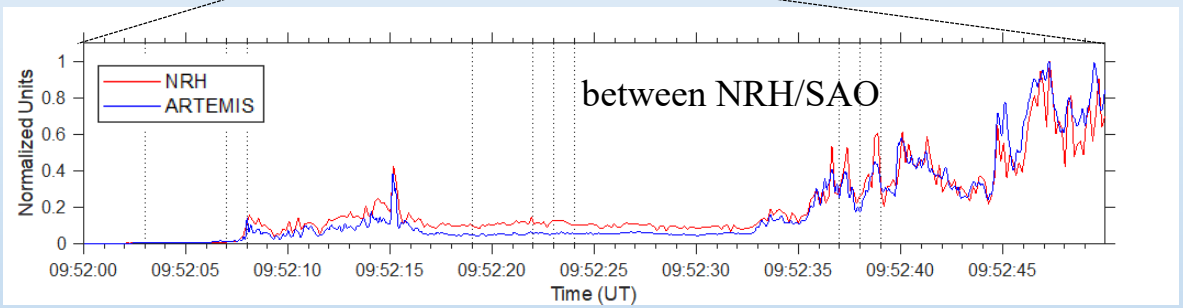
Keep in Mind:

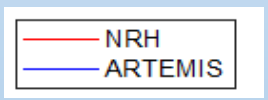
- ✓ Time Correction if needed (next slide)
- ✓ Create ASG receiver spectra for the whole event from FITS files
- ✓ SAO spectra for details (Fine Structure)
- ✓ Combine spectra with other instrument

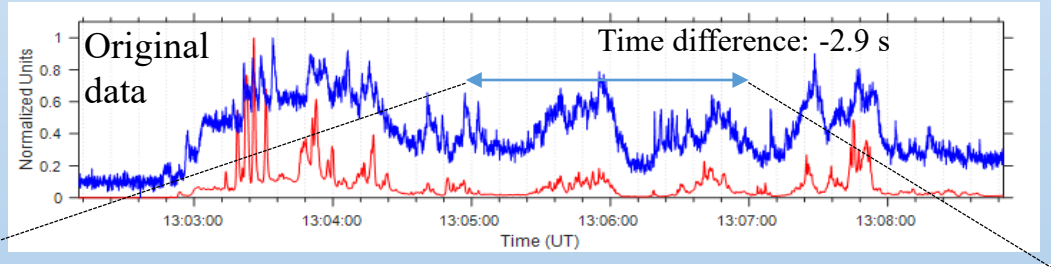
Higher/lower frequencies NRH (spatial analysis)

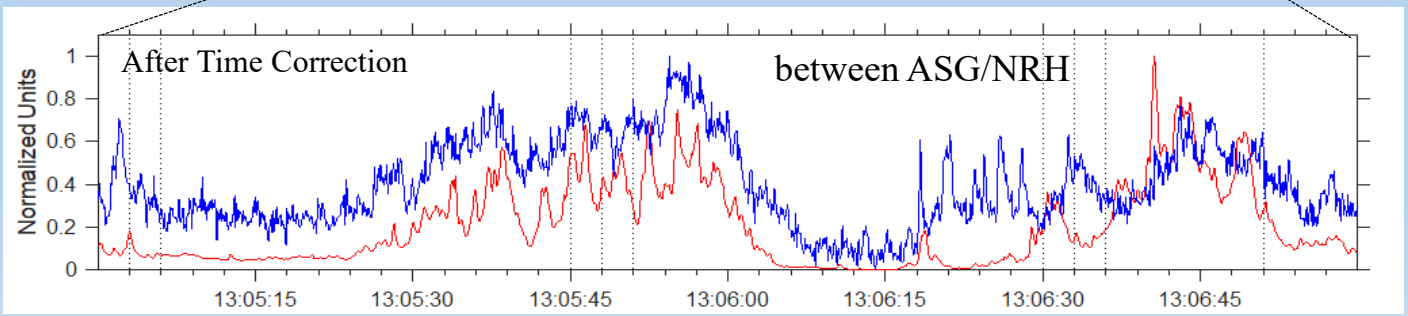
Example of cross correlation for time difference between Instruments









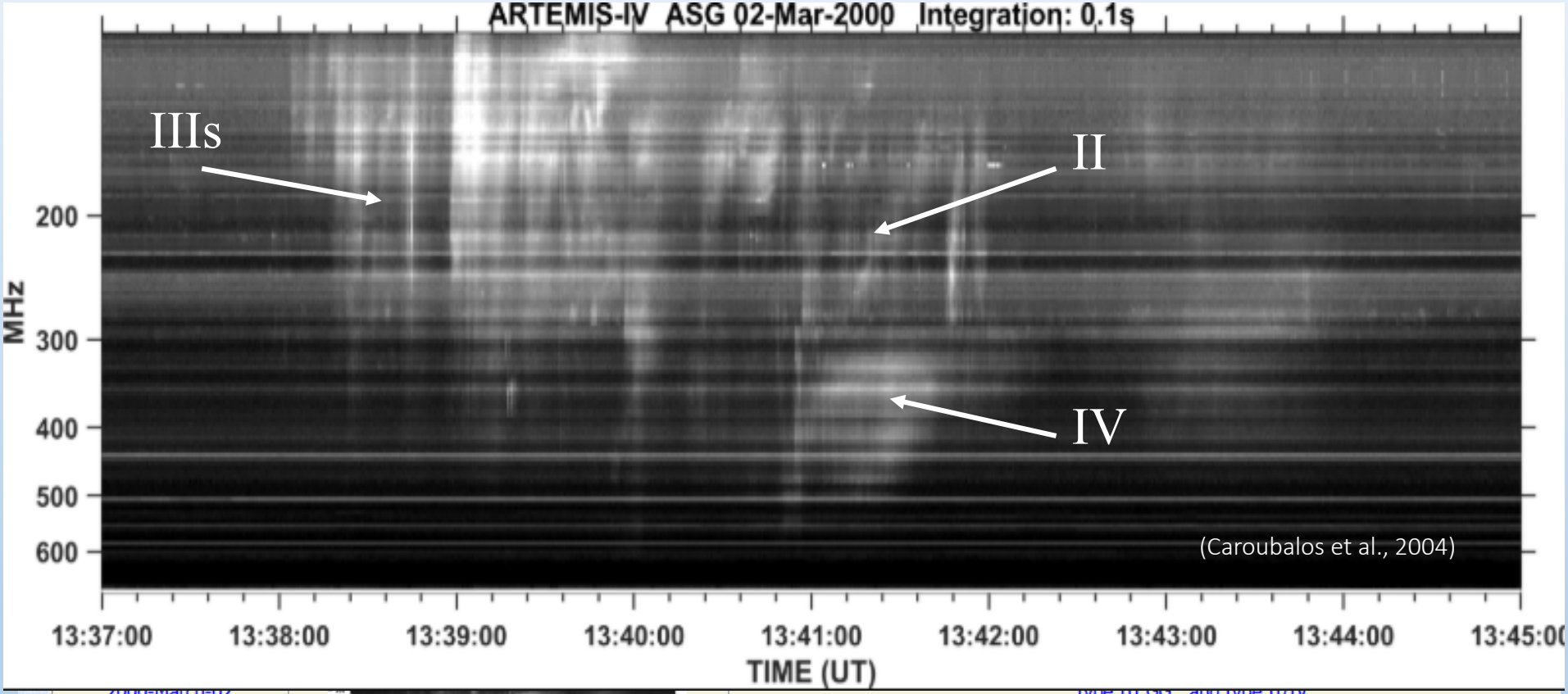


➢ARTEMIS-IV/JLS: Access & Data Downloading

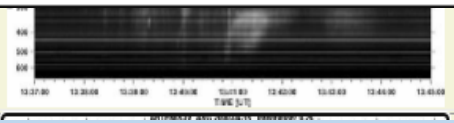
ARTEMIS/JLS (ARTEMIS-IV) Data Repository

#	Table of Contents
1	The DATA CATALOGUE (Bitmap Quick Looks & FITS Data Files from the ASG and SAO Receivers)
2	The GALLERY (Selected Dynamic Spectra from the ASG and SAO Receivers)
3	ARTEMIS/JLS (ARTEMIS-IV) PUBLICATIONS

➢ ARTEMIS-IV/JLS: Gallery



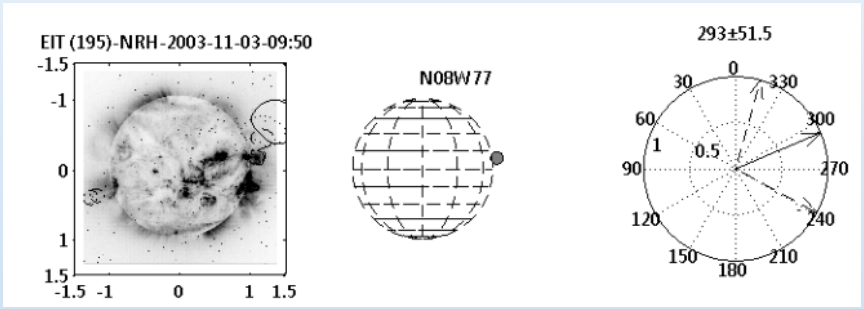
2000-March-02

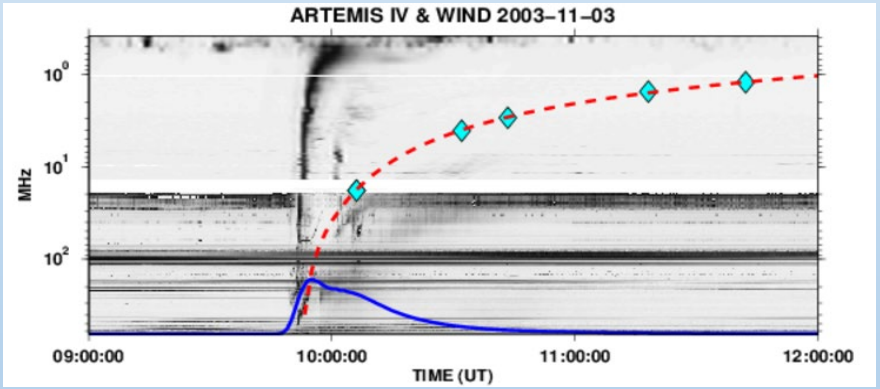


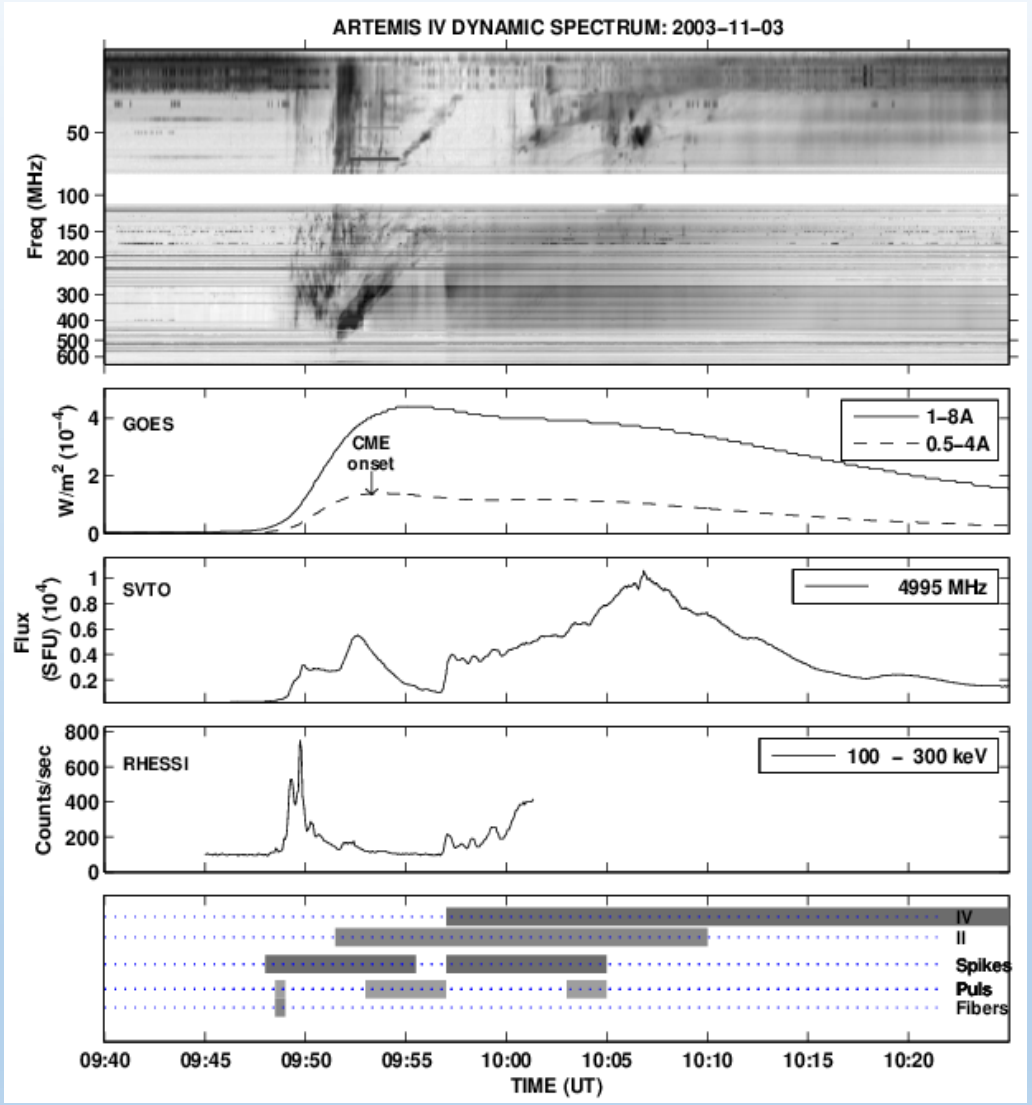
Type III GG, and type II/IV

See Caroubalos & al (2004)

➢ ARTEMIS-IV/JLS: Flare and CME with Type II – IV bursts







(Bouratzis et al., 2015)

➢ ARTEMIS-IV/JLS: Data Base - Catalogues

- 1,5 Gbytes of daily Data were in various means of storage (CDs, DVDs, DATs even FDs)
- At least 2 files for every receiver per day
- 365 days per year
- Almost 15 years of continuous operation
- Approx. 2500 of DVDs converted to ARTDB with more than 6TBytes of Total storage capacity

➢ ARTEMIS-IV/JLS: Type II Catalogue

Table 1: **Artemis-IV/JLS - Type II Metric Radiobursts Catalogue**

#	Date	**2 May 1998**	Time (UT)		Freq. (MHz)		Drift Rate		CME		
		Radio	Start	End	Start	End	(1/s)	Remarks	el. Onset (UT)	P.A (deg)	Width
		Type II (F)	13:41	13:45	300	110L	0.00519				
		Type II (H)	13:41	13:45	220	110L					

Table 1: **Artemis-IV/JLS - Type II Metric Radiobursts Catalogue**

2 May 1998	Time (UT)		Freq. (MHz)		Drift Rate	
Radio	Start	End	Start	End	(1/s)	Remarks
Type II (F)	13:41	13:45	300	110L	0.00519	
Type II (H)	13:41	13:45	220	110L		
Type III	13:35	13:38	630H	110L		
Type IV	13:41	14:54	630H	110L		
	Start	Peak	A. R	Goes Class	Location	
Flare	13:31	13:42	8210	X 11	S15W15	
	Onset	First Show	Ang. Width	P. A	Speed (km/s)	
CME	13:19	14:06	360	Halo	938	
Notes						

28	03/10/200		Start	Peak	A. R	Goes Class	Location	41
29	08/11/200	Flare	05:53	06:08		M14		
30	29/11/200		Onset	First Show	Ang. Width	P. A	Speed (km/s)	
31	11/12/200	CME	05:43	06:27	75	245	1265	42
32	13/12/200	Notes						60
33	29/12/200							50

➢ ARTEMIS-IV/JLS: Future improvements

- ➢ Expanding events catalogues
- ➢ Time correction given for every event
- ➢ Type II full catalogue (in preparation)
- ➢ Type IV full catalogue
- ➢ Type III catalogue
- ➢ Continue our Fine Structure research in Type II – IV RBs

ARTEMIS-IV\JLS -> ARTDB: the end

Thank you

http://artemis-iv.phys.uoa.gr
sarmatas@phys.uoa.gr

Abstract

Open-access data is vital for advancing solar and space physics, promoting collaboration and combination of diverse datasets. To this end, the ARTEMIS-IV/JLS free-access database (ARTDB), presented by the ARTEMIS-IV/JLS Group, provides extensive solar radio observations from the ARTEMIS-IV Multichannel Radiospectrograph, operated by the University of Athens at Thermopylae, Greece (Lat: 38° 49'N, Lon: 22° 41'E) , since 1996.

ARTEMIS-IV records daily spectra (05:30–15:00 UT) across 20–650 MHz using two parallel receivers:

- The Global Spectral Analyser (ASG) – covering the full band at 10 samples per second.
- The Acousto-Optic Spectrograph (SAO) – offering higher resolution (1.4 MHz, 100 samples per second) in the 265–450 MHz range.

Generating ~1.5 GB of data per day, ARTDB provides FITS-formatted spectral recordings and daily overview images (“Quick Looks”). The website (http://artemis-iv.phys.uoa.gr) also features select radio burst spectra, scientific publications, and educational resources.