

# Compilation of representative historical flood situations

WP3 – T3.9

Hendrik Zwenzner - DLR

# Objectives

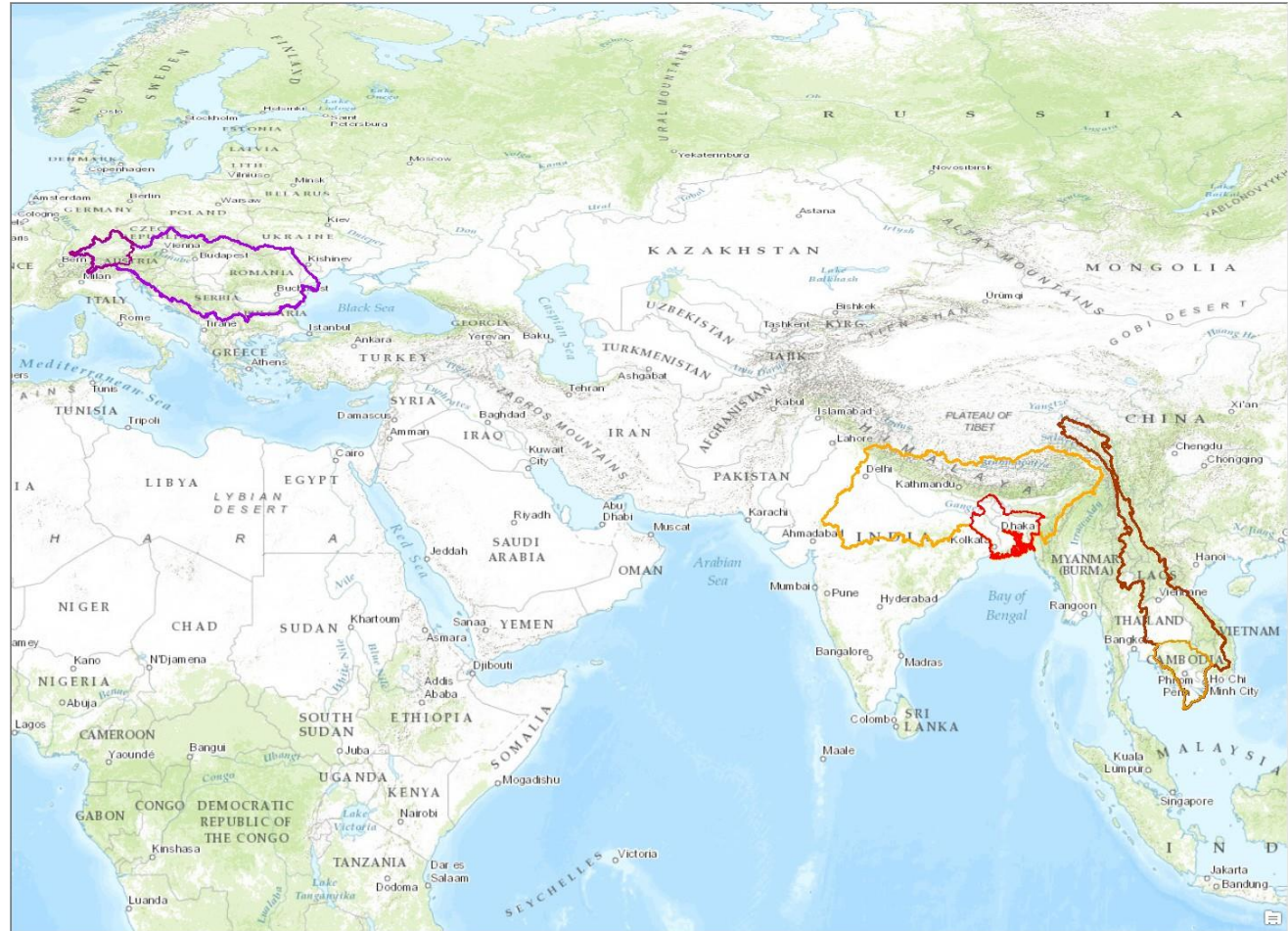
- Compilation of historical flooding situations for validation of GRACE derived flood and drought indices
- Identification of suitable test cases /basins (WP6)
  - Significant anomaly in daily GRACE solutions
  - Only within years 2006 and 2007 (GRACE reprocessing)
  - Flood regime and hydrological/environmental settings
  - Availability of EO satellite data (Int. Charter, ZKI, ... )
  - 2-D flood masks derived from SAR (and optical) data
  - Estimation of flood volumes

# Data retrieval

- Medium resolution SAR data (MR1 [30-100m] & MR2 [100-300 m])
  - ENVISAT (2002-2012): ASAR wideswath mode 150 m resolution (via Copernicus/ESA DWH)
  - Radarsat-1 (1995-2013): ScanSAR wide (100m) narrow (50m)
  - ALOS (2006-2011): Palsar ScanSAR mode (100m)
- Medium and low resolution Optical data
  - TERRA/AQUA MODIS (250m)
  - ENVISAT MERIS (300m)
  - Landsat series, ...
- Additional data
  - Satellite altimetry data (ENVISAT)
  - Water gauge, GPS,...

# Test cases

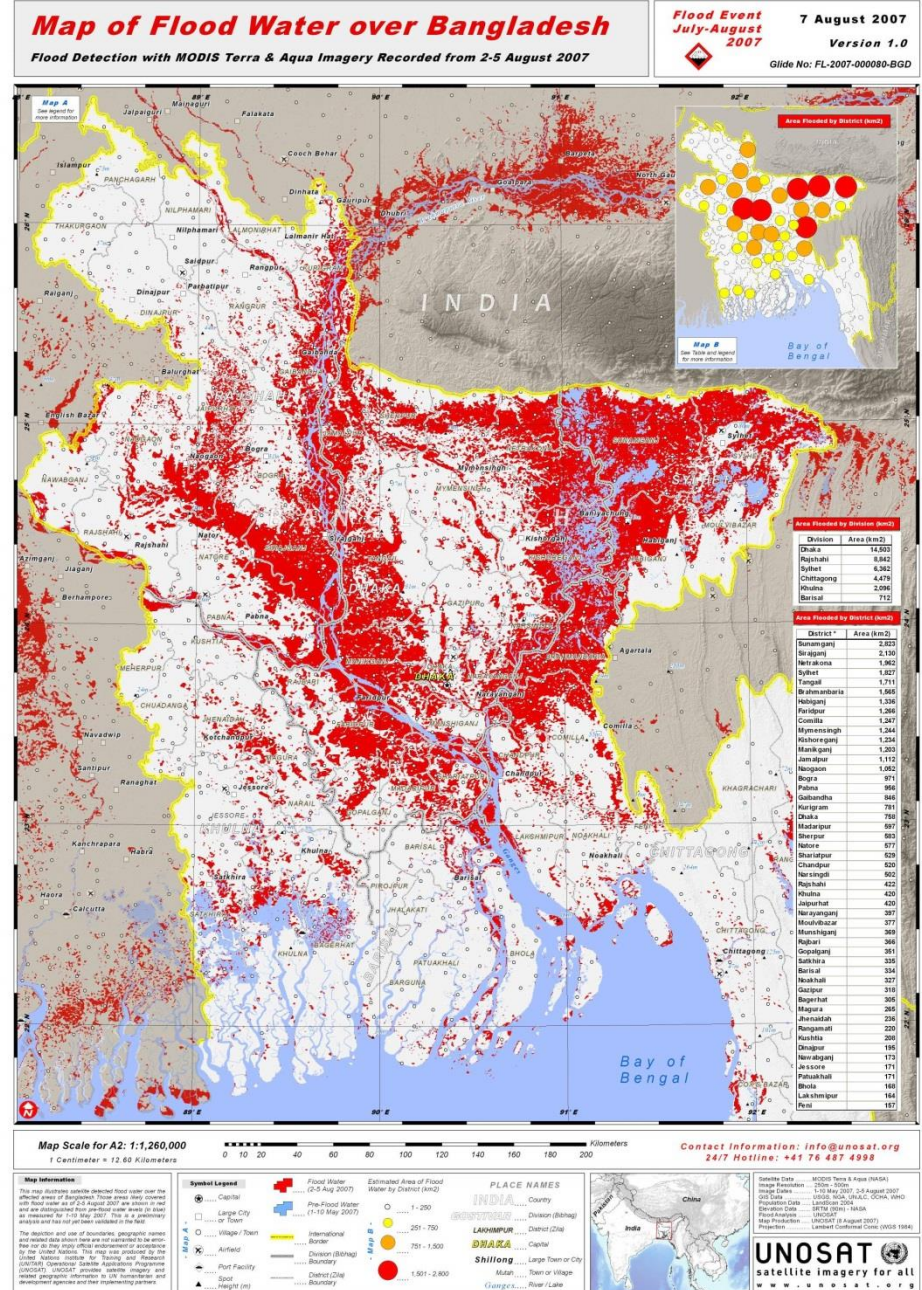
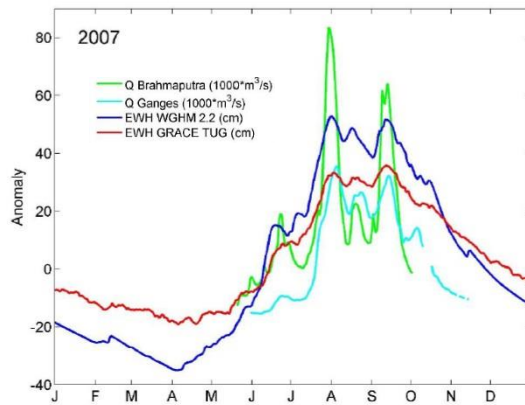
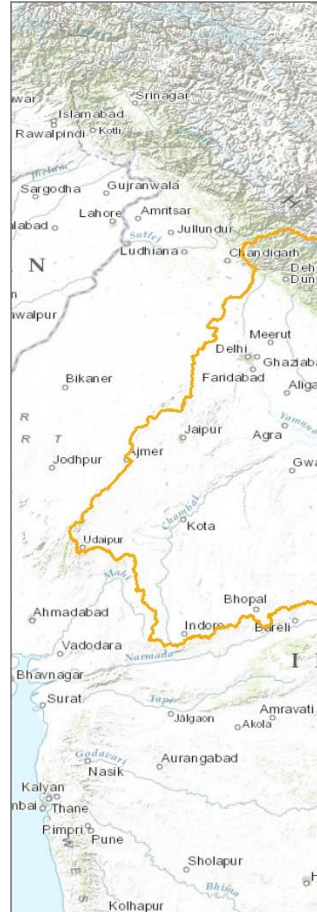
- Danube  
April 2006
- Ganges/Brahmaputra delta  
July-Sep 2007
- Mekong delta  
July-Oct 2006  
July-Oct 2007





# Ganges/Brahmaputra

- Extreme flood event
- Size: ca. 220.000 km<sup>2</sup>

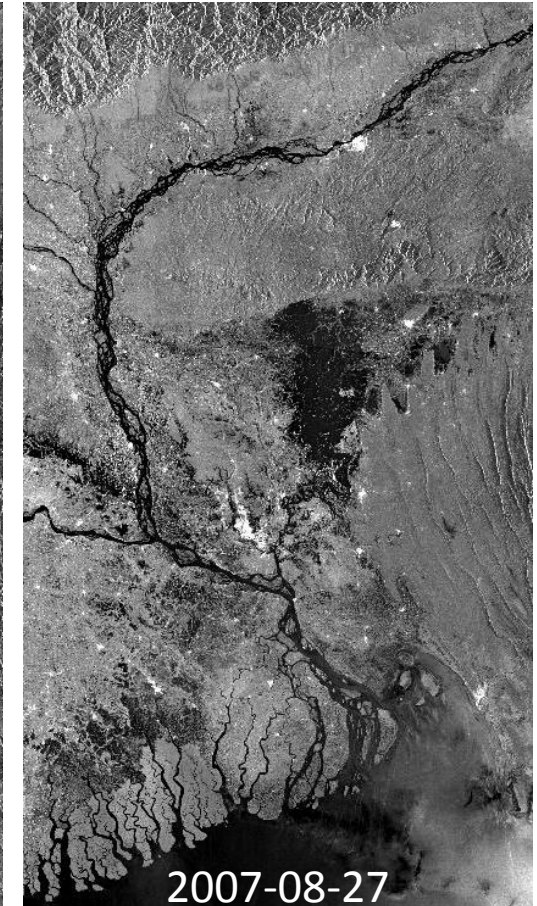
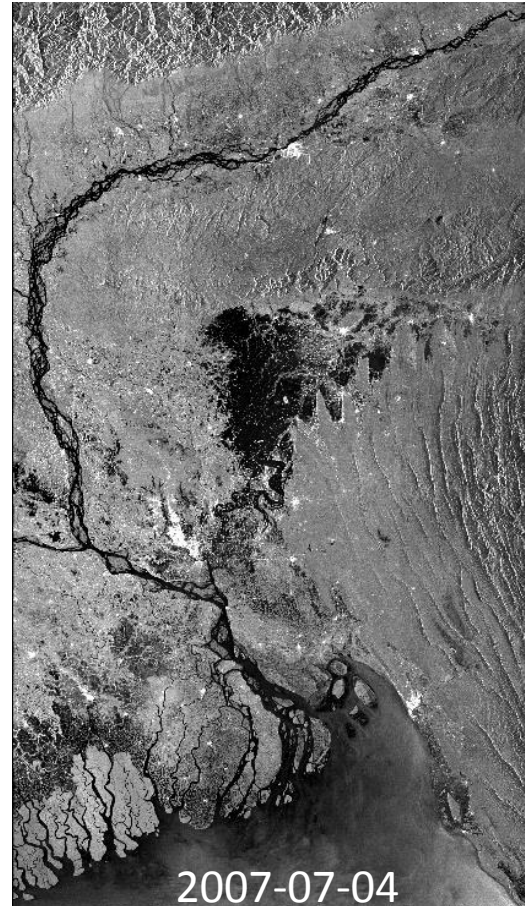
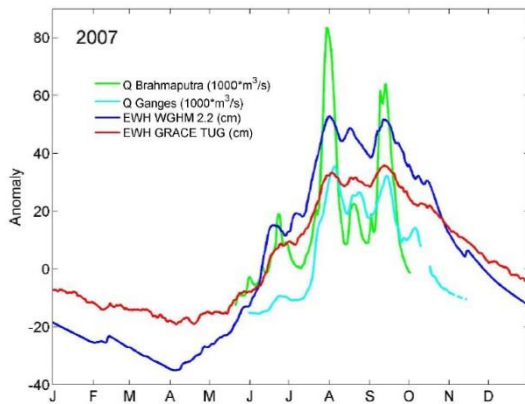




# Ganges/Brahmaputra

## ENVISAT-ASAR wideswath (150m)

Id	Mission	Sensor	date	track	pass
1	ENVISAT-1	ASAR/WS	2007-07-04	319	D
2	ENVISAT-1	ASAR/WS	2007-07-23	90	D
3	ENVISAT-1	ASAR/WS	2007-08-11	362	D
4	ENVISAT-1	ASAR/WS	2007-08-27	90	D
5	ENVISAT-1	ASAR/WS	2007-09-04	212	A
6	ENVISAT-1	ASAR/WS	2007-09-07	255	A
7	ENVISAT-1	ASAR/WS	2007-09-23	484	A
8	ENVISAT-1	ASAR/WS	2007-10-09	212	A

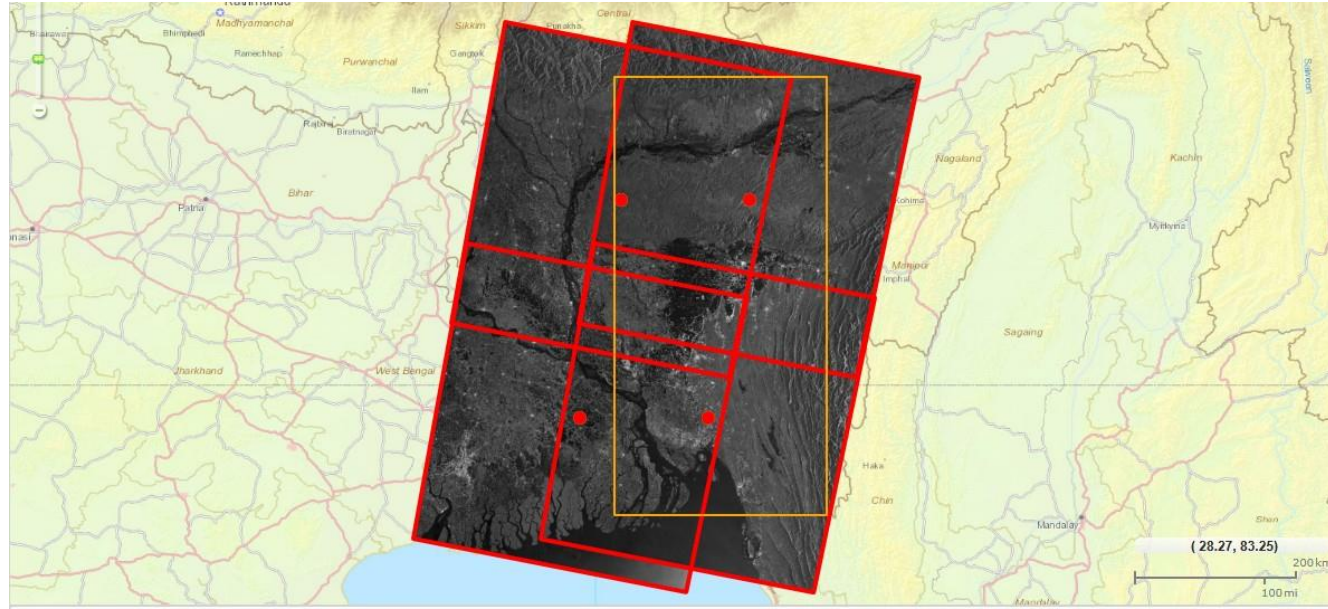
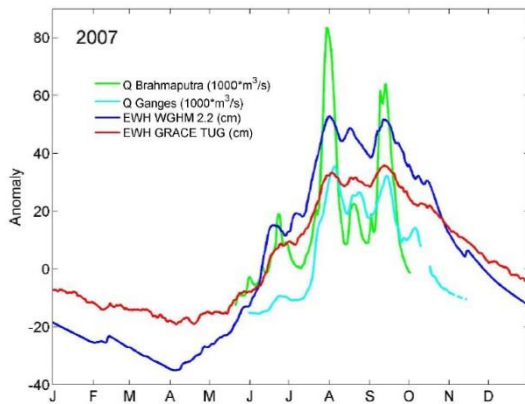




# Ganges/Brahmaputra

ALOS PALSAR  
(ScanSAR mode)  
100 m resolution  
350 km swath width

2007-08-12  
2007-09-22



Search Results Total Result Matched: 10 Displaying: 4 Filtered: 6

Show Checked  Show Highlighted  Check Highlighted **Export**

	Scene ID	Sensor Name	Satellite Name	Observation Start Date	Observation End Date	Operation Mode	OBS Path Number	Centre Frame Number
<input checked="" type="checkbox"/>	ALPSRS082433100	PALSAR	ALOS	2007/08/12 04:27:27	2007/08/12 04:30:49	WB1	148	3100
<input checked="" type="checkbox"/>	ALPSRS082433150	PALSAR	ALOS	2007/08/12 04:27:27	2007/08/12 04:30:49	WB1	148	3150
<input checked="" type="checkbox"/>	ALPSRS088413100	PALSAR	ALOS	2007/09/22 04:20:50	2007/09/22 04:24:12	WB1	145	3100
<input checked="" type="checkbox"/>	ALPSRS088413150	PALSAR	ALOS	2007/09/22 04:20:50	2007/09/22 04:24:12	WB1	145	3150

# Ganges/Brahmaputra

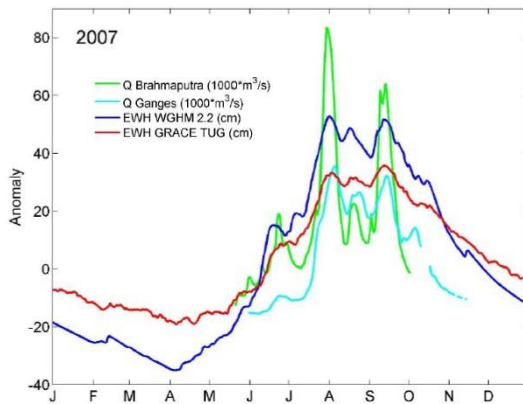
## Radarsat-1

(ScanSAR mode)

Narrow: 50 m resolution

Wide: 100 m resolution

Id	Mission	Mode	Date	Beam
1	Radarsat-1	ScanSAR	2007-07-15	wide
2	Radarsat-1	ScanSAR	2007-07-16	narrow
3	Radarsat-1	ScanSAR	2007-08-02	wide
4	Radarsat-1	ScanSAR	2007-08-09	narrow
5	Radarsat-1	ScanSAR	2007-09-01	wide
6	Radarsat-1	ScanSAR	2007-09-02	narrow
7	Radarsat-1	ScanSAR	2007-09-18	wide
8	Radarsat-1	ScanSAR	2007-09-25	wide
9	Radarsat-1	ScanSAR	2007-10-12	wide
10	Radarsat-1	ScanSAR	2007-10-13	wide

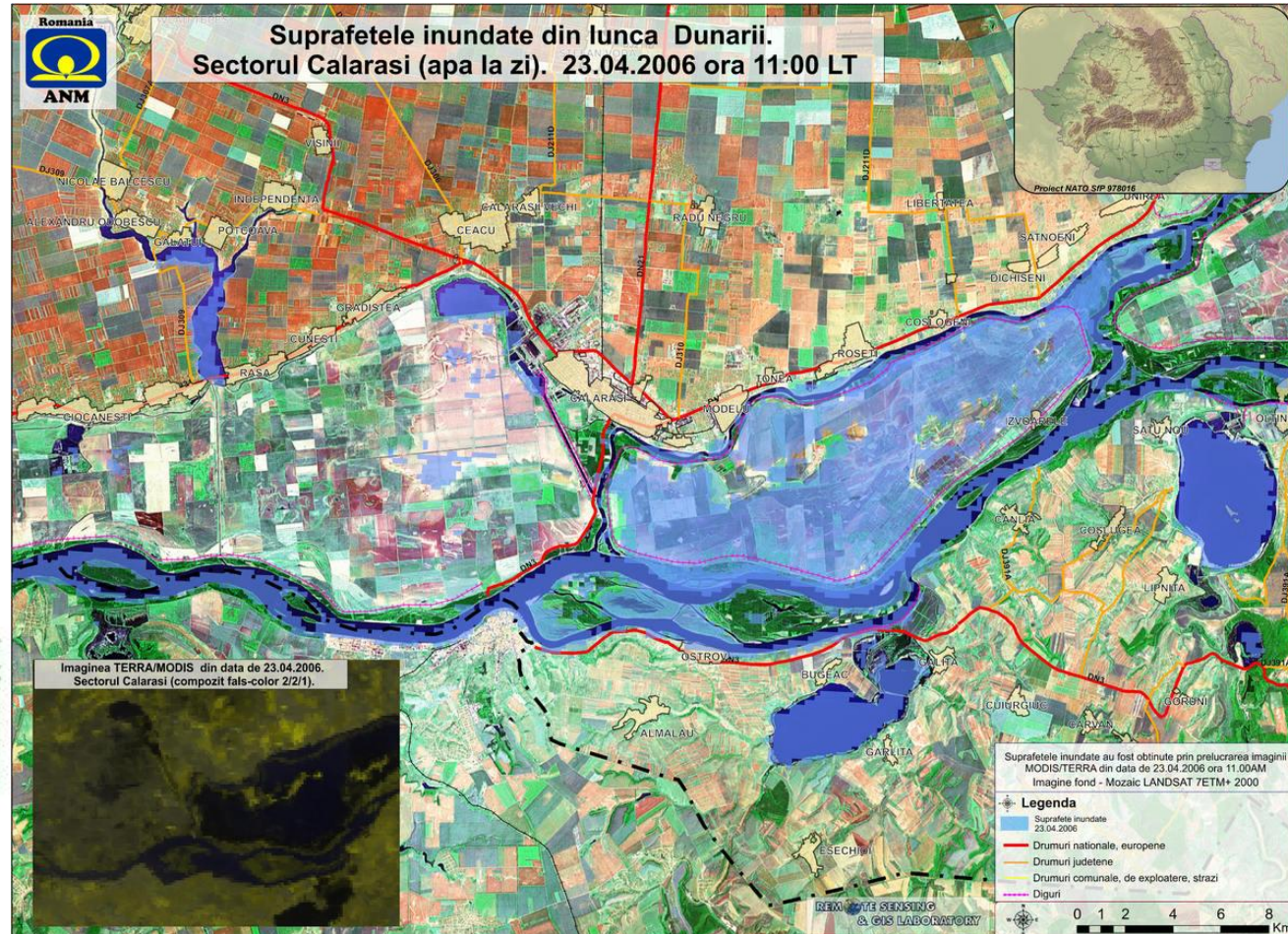
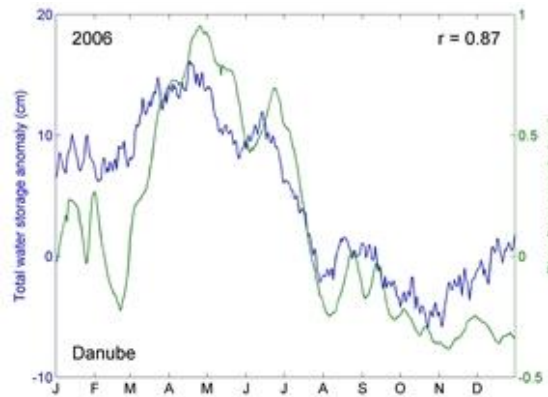
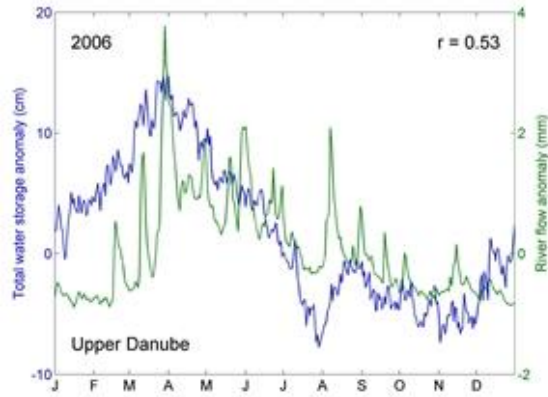


+ Cloud free optical MODIS image (250 m resolution) from 2007-08-20

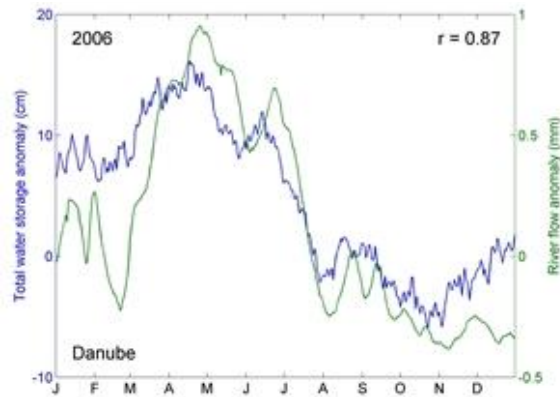
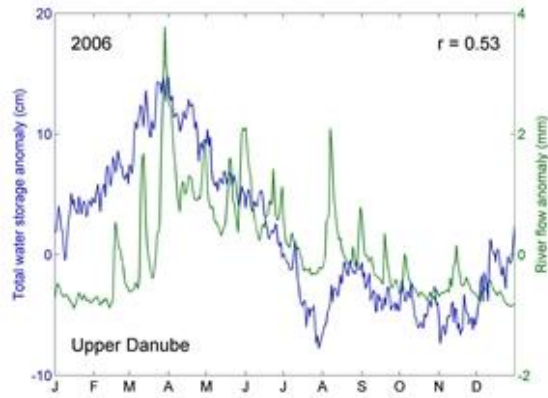


# Danube

- 18 April ..... Flooding in Romania
- 14 April ..... Flooding in Hungary
- 07 April ..... Flooding in Austria



# Danube



## Upper Danube

Id	Mission	Sensor	Date	Track	Pass
1	ENVISAT-1	ASAR/WS	2006-03-31	258	A
2	ENVISAT-1	ASAR/WS	2006-04-04	308	D
3	ENVISAT-1	ASAR/WS	2006-04-04	315	A
4	ENVISAT-1	ASAR/WS	2006-04-13	444	A
5	ENVISAT-1	ASAR/WS	2006-04-20	43	A

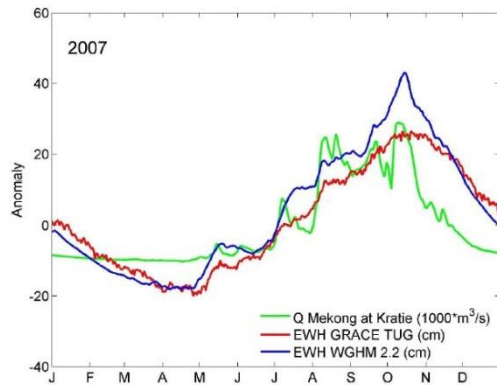
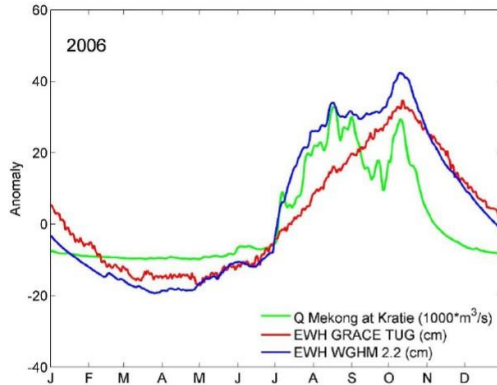
## Lower Danube (Romania)

Id	Mission	Sensor	Date	Track	Pass
1	ENVISAT-1	ASAR/WS	2006-04-18	7	D
2	ENVISAT-1	ASAR/WS	2006-04-18	14	A
3	ENVISAT-1	ASAR/WS	2006-04-21	57	A
4	ENVISAT-1	ASAR/WS	2006-04-24	100	A
5	ENVISAT-1	ASAR/WS	2006-04-27	143	A

+ no ALOS Palsar, no Radarsat-1 data, lots of high res optical data



# Mekong

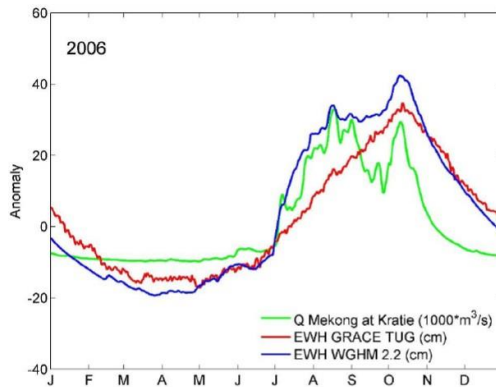


# Mekong

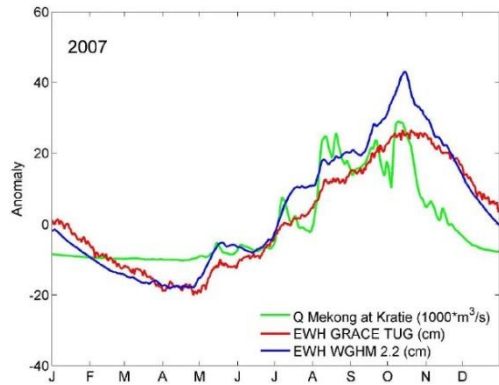
- ENVISAT ASAR  
(Wideswath mode)
- ALOS PALSAR  
(ScanSAR mode)

Id	Mission	Sensor	Date	Track	Pass
1	ENVISAT-1	ASAR/WS	2006-07-19	261	D
2	ENVISAT-1	ASAR/WS	2006-08-06	75	D
3	ENVISAT-1	ASAR/WS	2006-09-23	261	D
4	ENVISAT-1	ASAR/WS	2006-10-19	140	A

Id	Mission	Sensor	Date
1	ALOS	PALSAR/SC	2006-09-15
2	ALOS	PALSAR/SC	2006-09-27
3	ALOS	PALSAR/SC	2006-10-02
4	ALOS	PALSAR/SC	2006-10-14







## ENVISAT ASAR

Id	Mission	Sensor	Date	Track	Pass
1	ENVISAT-1	ASAR/WS	2007-07-03	304	D
2	ENVISAT-1	ASAR/WS	2007-07-10	412	A
3	ENVISAT-1	ASAR/WS	2007-07-19	32	D
4	ENVISAT-1	ASAR/WS	2007-07-23	97	A
5	ENVISAT-1	ASAR/WS	2007-07-29	183	A
6	ENVISAT-1	ASAR/WS	2007-08-07	304	D
7	ENVISAT-1	ASAR/WS	2007-08-14	412	A
8	ENVISAT-1	ASAR/WS	2007-08-23	32	D
9	ENVISAT-1	ASAR/WS	2007-09-02	183	A
10	ENVISAT-1	ASAR/WS	2007-09-11	304	D
11	ENVISAT-1	ASAR/WS	2007-09-18	412	A
12	ENVISAT-1	ASAR/WS	2007-10-16	304	D

## ALOS PALSAR

Id	Mission	Sensor	Date
1	ALOS	PALSAR/SC	2007-07-05
2	ALOS	PALSAR/SC	2007-07-24
3	ALOS	PALSAR/SC	2007-07-29
4	ALOS	PALSAR/SC	2007-08-03
5	ALOS	PALSAR/SC	2007-08-15
6	ALOS	PALSAR/SC	2007-09-13
7	ALOS	PALSAR/SC	2007-09-18
8	ALOS	PALSAR/SC	2007-10-29
9	ALOS	PALSAR/SC	2007-09-02
10	ALOS	PALSAR/SC	2007-09-11
11	ALOS	PALSAR/SC	2007-09-18
12	ALOS	PALSAR/SC	2007-10-16

# Next steps

- ENVISAT ASAR data will be obtained via Copernicus/ESA DWH (end of January 2016)
- Apply automated flood processing algorithm (developed for TerraSAR-X and Sentinel-1) to derive 2-D flood mask
- compare results from automated flood processing with semi-automatic approaches
- Test and apply flood volume estimation approach (WP6)