

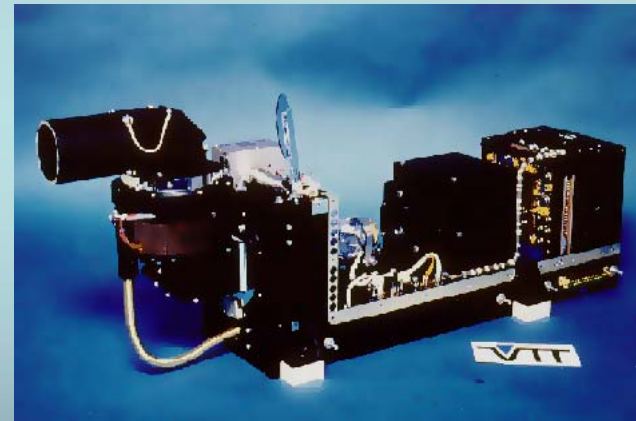
The Deep Impact Event as Seen by the SWAN Instrument

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EuroPlanet meeting
21-23 August 2006, Helsinki, Finland**

The Deep Impact Event



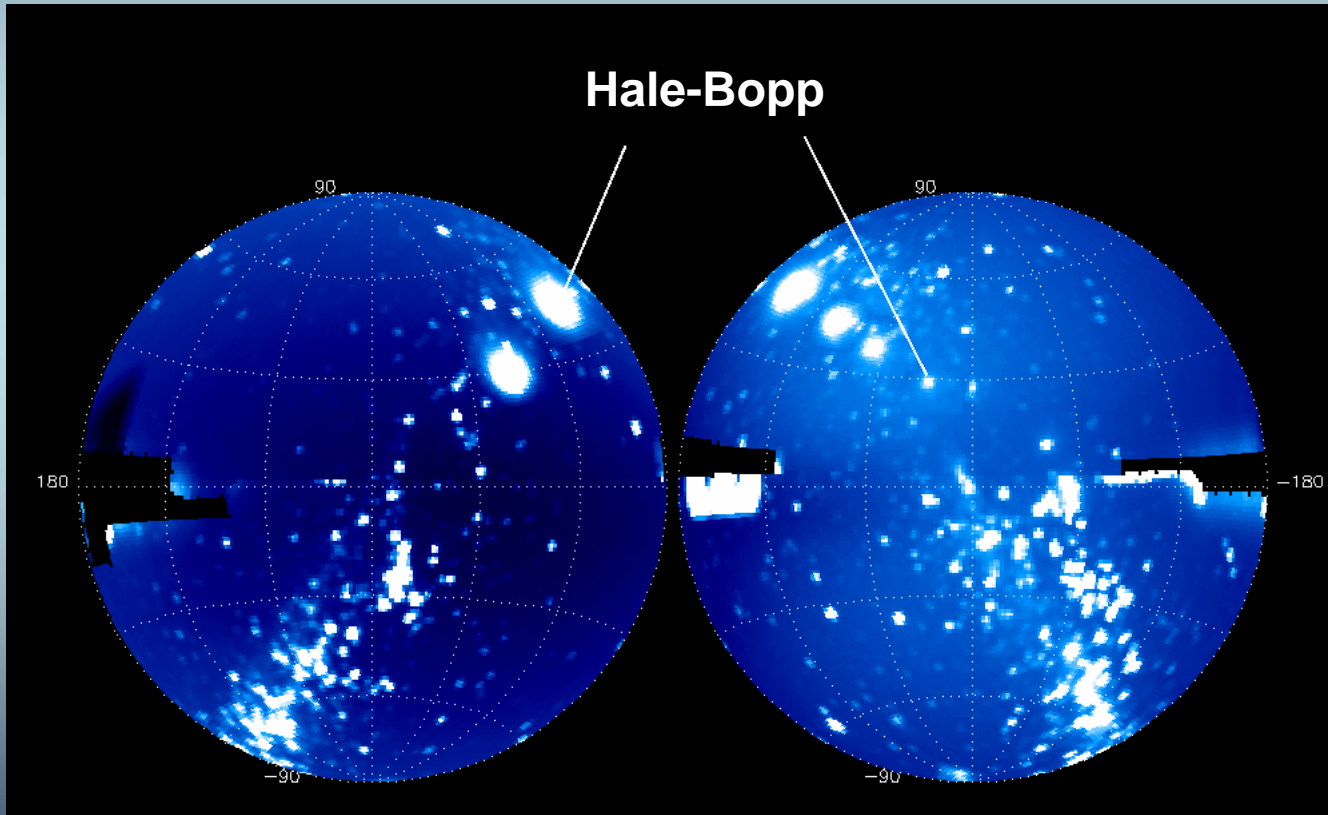
The SWAN Instrument



SWAN Facts

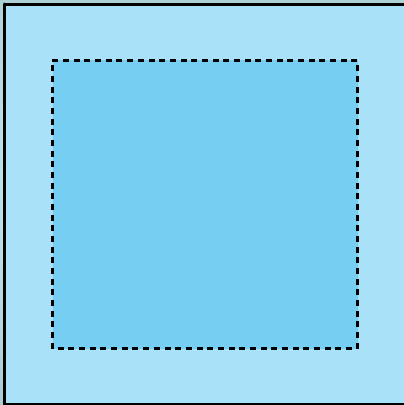
- launched in Dec 1995 on board the SOHO spacecraft
- on a halo orbit around the L1 point between the Earth and the Sun
- consists of 2 identical sensor units on each side of the spacecraft
- instantaneous FOV of 5x5 degrees with 1 degree resolution
- periscope mechanisms allows each unit to scan an entire hemisphere
- photometric measurements at Lyman-alpha wavelength (121.6 nm), images combined from snapshots with 13 s exposure time
- primary scientific objective to determine the distribution of interplanetary neutral hydrogen, visible through the resonantly scattered solar Lyman-alpha light, and from that determine properties of the solar wind that is modifying the distribution
- since comets are an additional source of neutral hydrogen through photodissociation of water, SWAN can be used to estimate the water production rate of a comet
- SWAN has excellent spatial and temporal coverage and is not hindered by geocoronal Lyman-alpha reflection
- challenges for cometary observations are low resolution and large background contribution from interplanetary neutral hydrogen and UV stars

SWAN View of the UV Sky



SWAN Observing Modes

Comet mode (C)



20x20 degree scan in 0.5 degree steps, duration 480 min and effective exposure 21.7 min for a 1x1 degree target pixel inside central area

Stare mode (S)



fixed pointing with 5x5 degree FOV, duration 970 min and effective exposure 840 min for each 1x1 degree pixel on the sensor plate

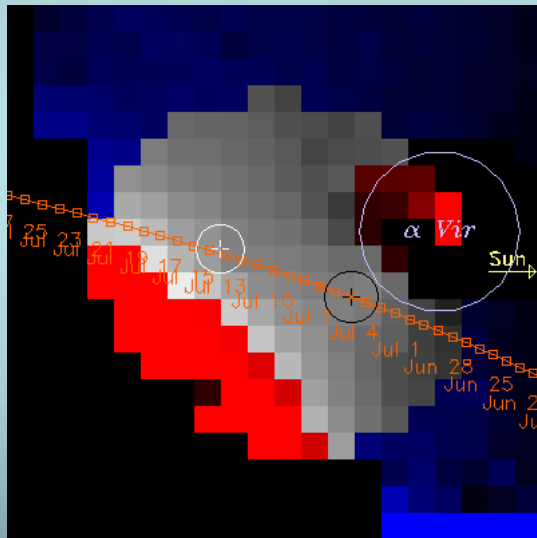
Observing Program for 9P

Date	Time UT	Mode
Jun 20	22:00	C
Jun 22	13:40	C
Jun 25	04:20	C
Jun 27	13:20	C
Jun 29	07:20	C
Jun 30	16:40	C
Jul 02	02:00	C
Jul 03	11:20	C
Jul 03	19:20	S
Jul 04	12:30	C
Jul 04	20:30	S
Jul 05	12:40	C
Jul 05	20:40	S
Jul 07	14:10	S
Jul 08	06:20	C
Jul 08	14:20	S
Jul 10	07:50	S

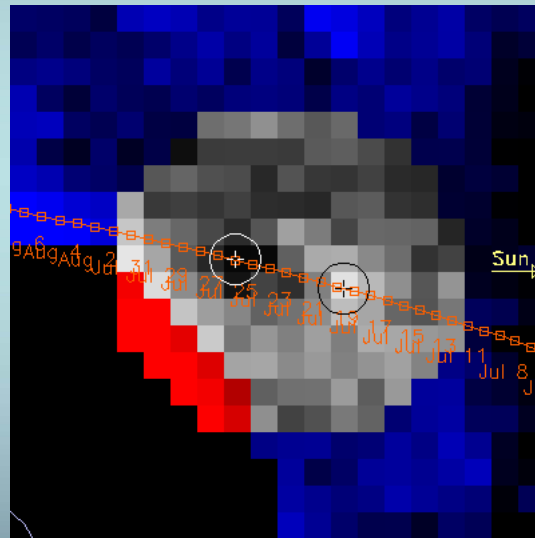
Date	Time UT	Mode
Jul 11	00:00	C
Jul 11	08:00	S
Jul 13	01:30	S
Jul 13	17:40	C
Jul 14	01:40	S
Jul 15	19:10	S
Jul 16	11:20	C
Jul 16	19:20	S
Jul 18	12:50	S
Jul 19	05:00	C
Jul 19	13:00	S
Jul 21	06:30	S
Jul 23	00:00	C
Jul 25	09:00	C
Jul 27	09:20	C
Jul 30	00:00	C

SWAN Observations of 9P

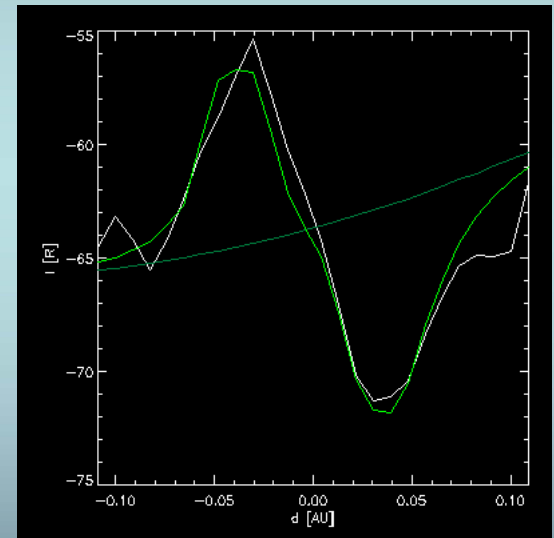
Differential imaging is used to eliminate most of the background field.



July 5 & 14

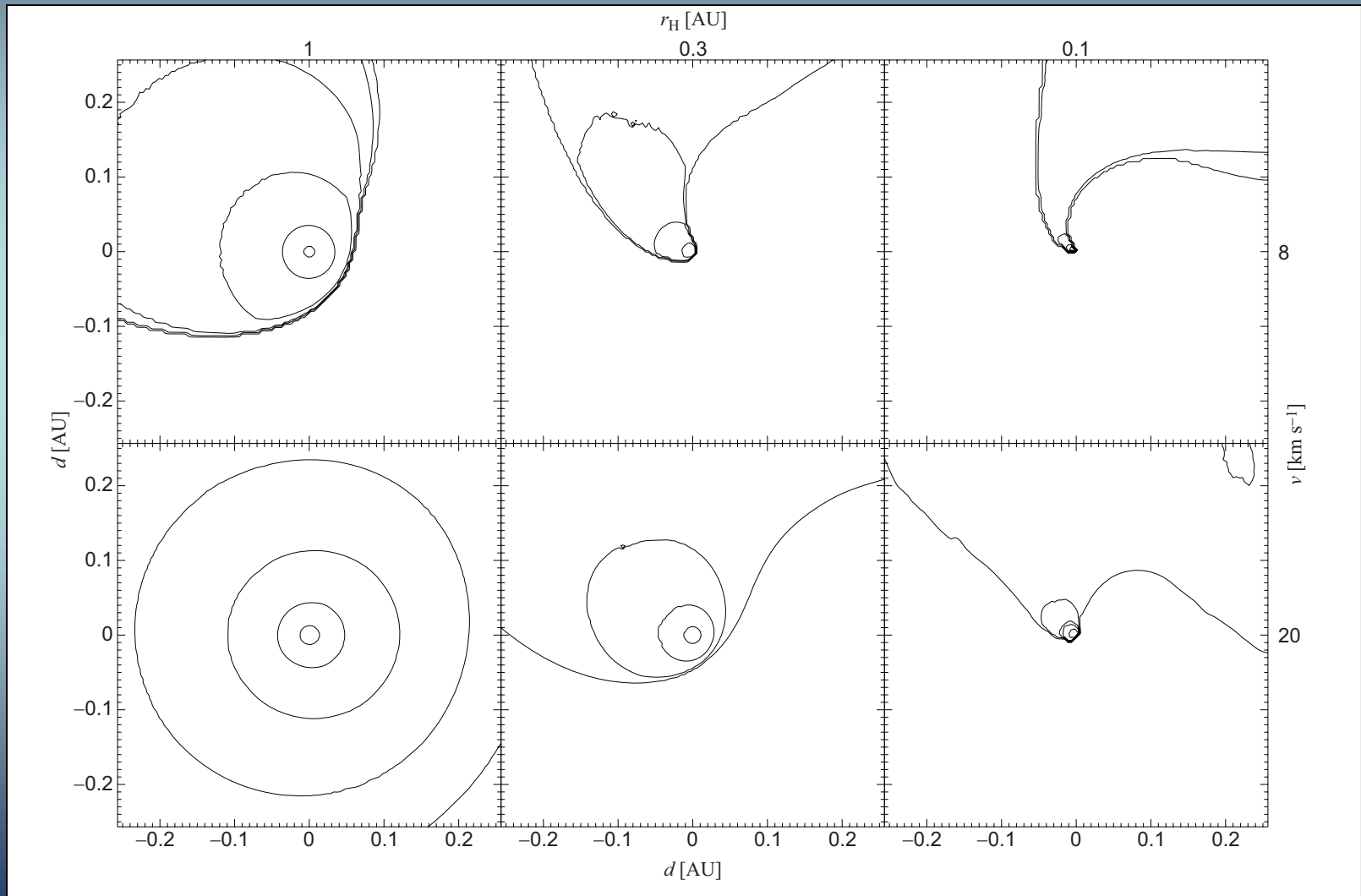


July 19 & 26

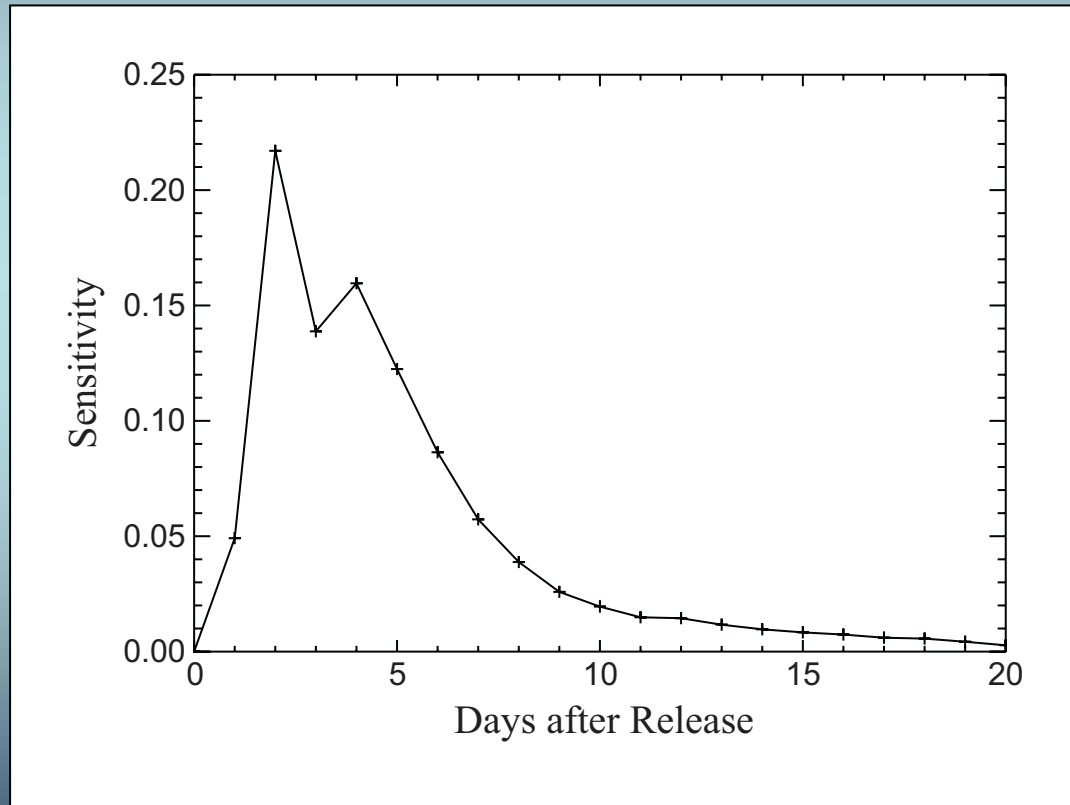


July 19 & 26

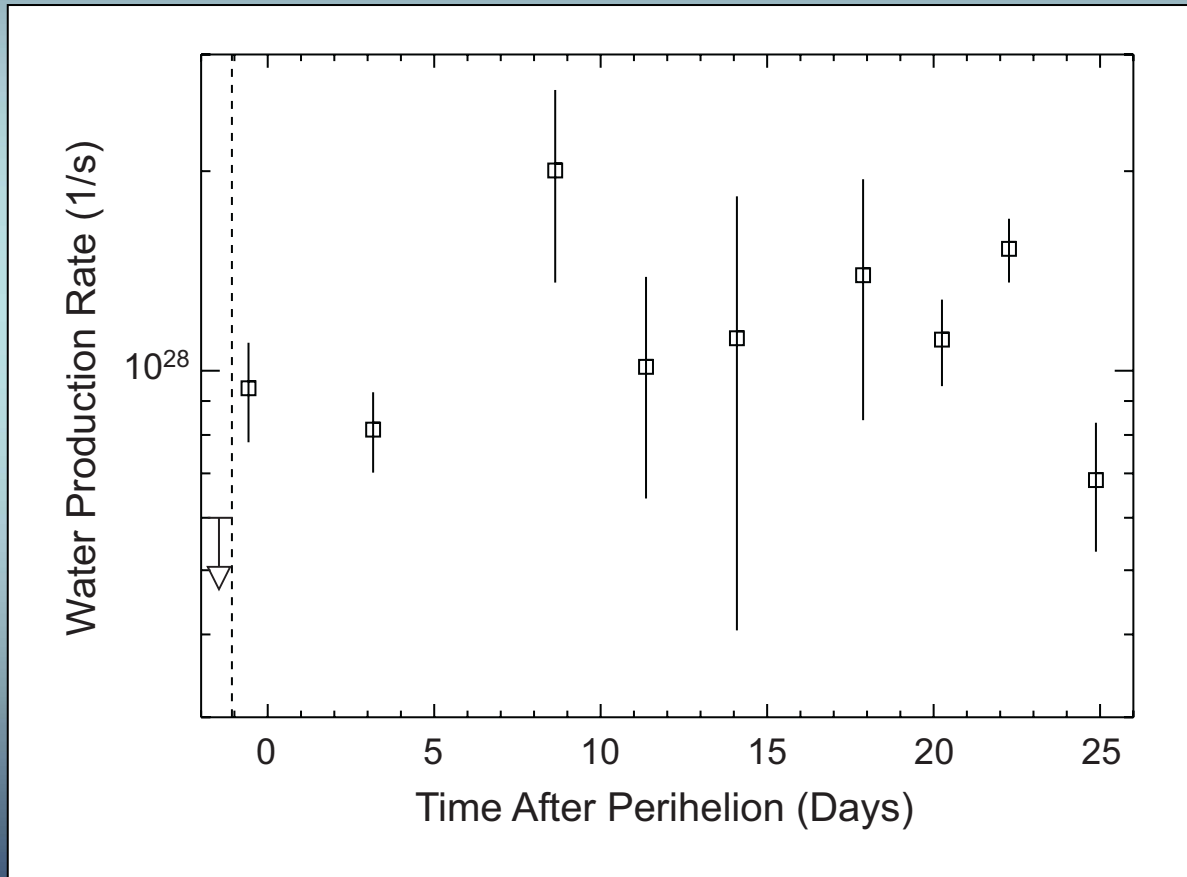
TRM – A Physically Accurate Hydrogen Coma Model



Temporal Sensitivity of the Analysis Method



Water Production Profile



Conclusions

- SWAN observed 9P/Tempel about two months around the Deep Impact event
- SWAN didn't see the actual impact and the increase in activity was not significant in comparison with normal activity fluctuations
- there was a sustained increase in activity about 2 weeks after the impact which couldn't be directly related to the event and evidence for an indirect relation is inconclusive as well