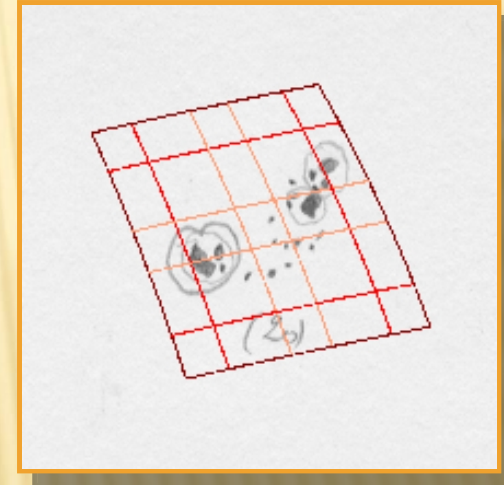
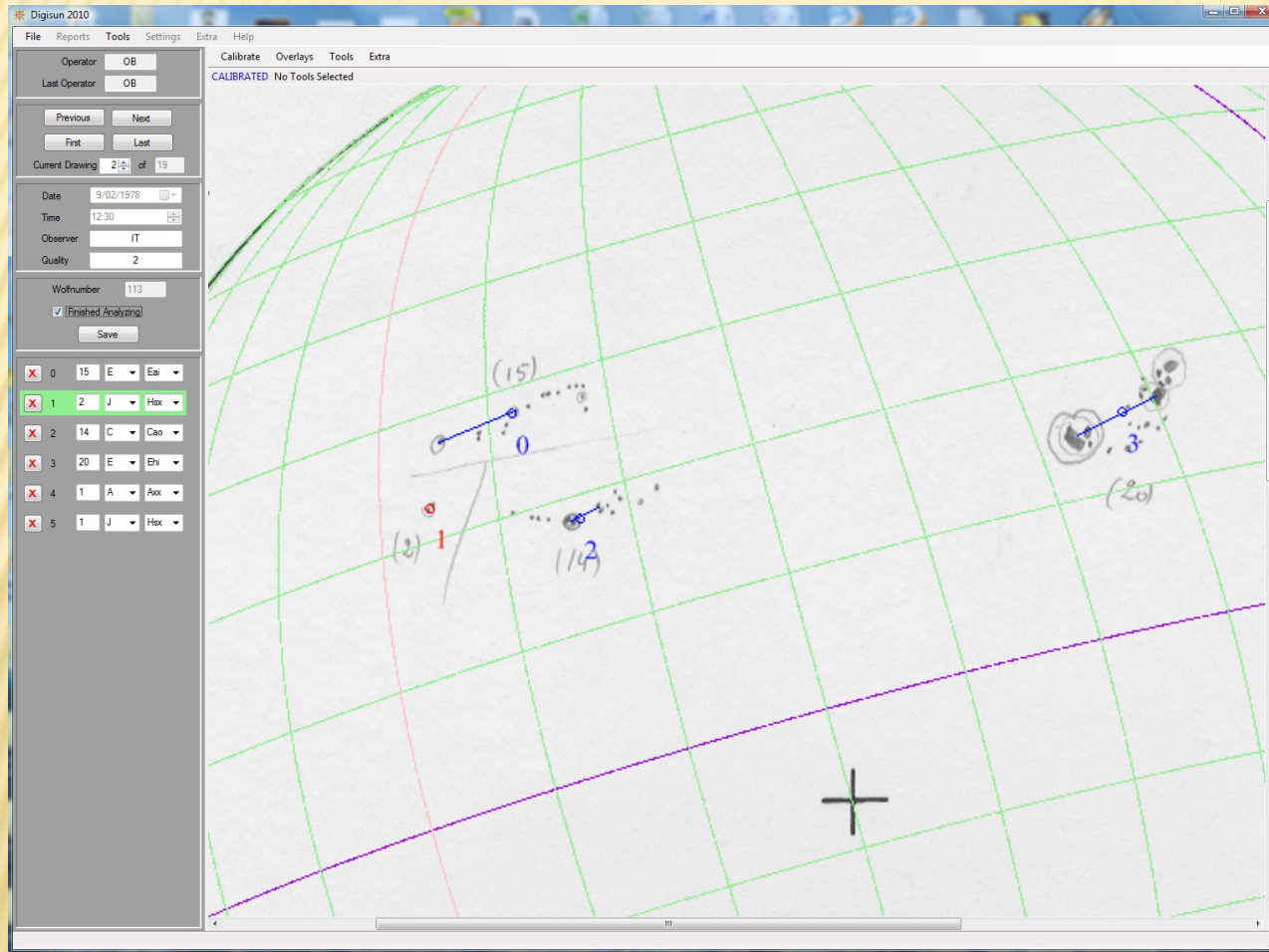


F. Clette, October 2010

## WP2 AT ROB: REPORT

# USET SUNSPOT DRAWINGS



## USET SUNSPOT DRAWINGS: CURRENT PROGRESS (15 MONTHS)

|      |      |      |      |      |      |             |      |      |      |
|------|------|------|------|------|------|-------------|------|------|------|
| 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946        | 1947 | 1948 | 1949 |
| 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956        | 1957 | 1958 | 1959 |
| 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966        | 1967 | 1968 | 1969 |
| 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976        | 1977 | 1978 | 1979 |
| 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986        | 1987 | 1988 | 1989 |
| 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996        | 1997 | 1998 | 1999 |
| 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | <u>2006</u> | 2007 | 2008 | 2009 |

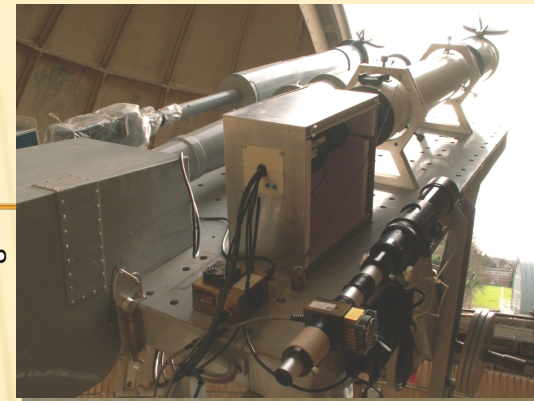
- Scanned
- Measured
- Completed

### Document scanning:

Done largely by summer job students

- 58 years over 70 (83%) in 4 man\*months
- 0.8 man\*month to completion
- Catalog construction (sunspot measurements and classification):
  - 31 years completed (44%) + 9 years (13%) in progress over 70 years
  - Priority given to the period 1983-2009 to allow joint studies with the DPD and USAF/ Mount Wilson catalogs.
  - At the same progress rate, completed in 11 months (August 2011)

# UCCLE SOLAR IMAGES (USET)



## Data production ([sidc.be/uset](http://sidc.be/uset)):

~250 sunspot drawings / last 12 months

- ~1500 synoptic images / last 12 months (H-alpha, white-light)
- Given the low solar activity, no flare sequences ( yet ! )
- Continuous flare movie mode:
  - <sup>1</sup> almost completed (post-processing in development)
  - Will be run both in white-light and in H-alpha (+ Call-K)

## □ Data distribution:

- New upgrades to the USET web site (interactive instrument description, etc.)
- USET data used as a test-bed for the SoTerIA virtual observatory (SODA)
- USET data soon available on general portals: BASS2000, GHAN

## □ Hardware development:

- New improved image quality:
  - New front aperture filter (ND3.5) on the white-light CCD imaging telescope
  - New optical bench and focusing mechanism on H-alpha telescope

## □ In preparation:

- Motorized micro-focusing mechanisms on all cameras
- New Call-K telescope (focal optics currently manufactured):

expected start of operations in early 2011

USET, H $\alpha$ , 30/9/2010



# PHOTOSPHERIC INDEX STUDIES

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Driven by SoTerIA post-doc (since Nov. 1, 2009): **Laure Lefèvre**

- **Step 1: survey of available and usable sunspot and faculae catalogs.**

Completed: more than 20 catalogs

- **Step 2: selection of core-catalogs for test-bed studies :**

- Completed: DPD (Debrecen) + USAF / Mount Wilson were selected.

- Covered period: last two solar cycles (1983- 2009)

- Catalog merging: work in progress (challenge: 20% unmatched sunspot groups)

- **Step 3: Study of reconstructed indices based on multi-parametric sunspot group data:**

- First application: DPD-based reconstruction of the international sunspot index  $R_i$ .

# PHOTOSPHERIC INDEX STUDIES

## New science results:

Diagnostic tool: DPD/Ri fitting points at DPD catalogs entries that do not qualify as sunspots

- ➔
  - feedback for refining the DPD catalog contents
  - ▣ Improved understanding of the visibility criteria of sunspots in collective visual observations leading to  $R_1$ ,  $R_2$ , etc.
- ➔ Identification of a possible recent bias in the reference  $R_1$  series

## ▣ Upcoming tasks:

- ▣ Completion of the DPD/USAF merging + addition of the Uccle catalog
- ▣ Investigation of the post-2000  $R_1$  bias.
- ▣ Extension to other indices (F10.7cm, TSI, MgII)
- ▣ Extension to other sunspot group parameters