

GWP-S-640:

Radial velocity calibration & zero-point

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*Many thanks to F. Thévenin for the presentation of this talk,
and to F. Mignard for the simulation data.*

This talk :

- **List of potential calibration stars**
- **List of potential calibration asteroids**
- **Ground-based observations of stars & asteroids**

Improvement of the star list:

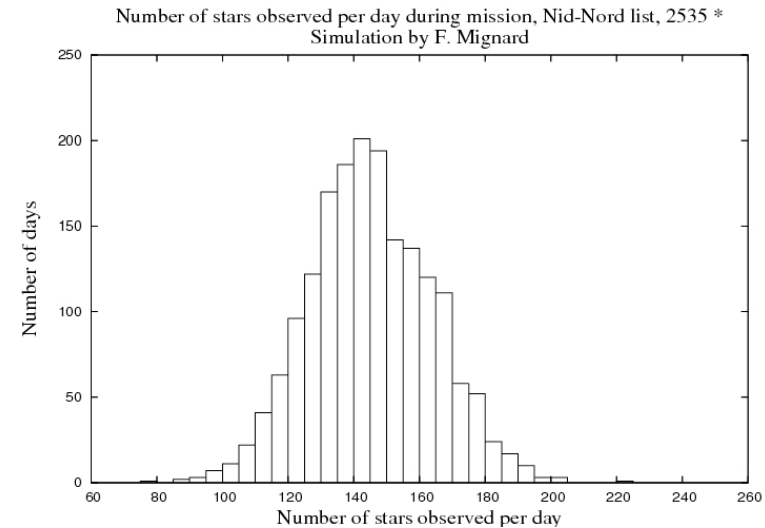
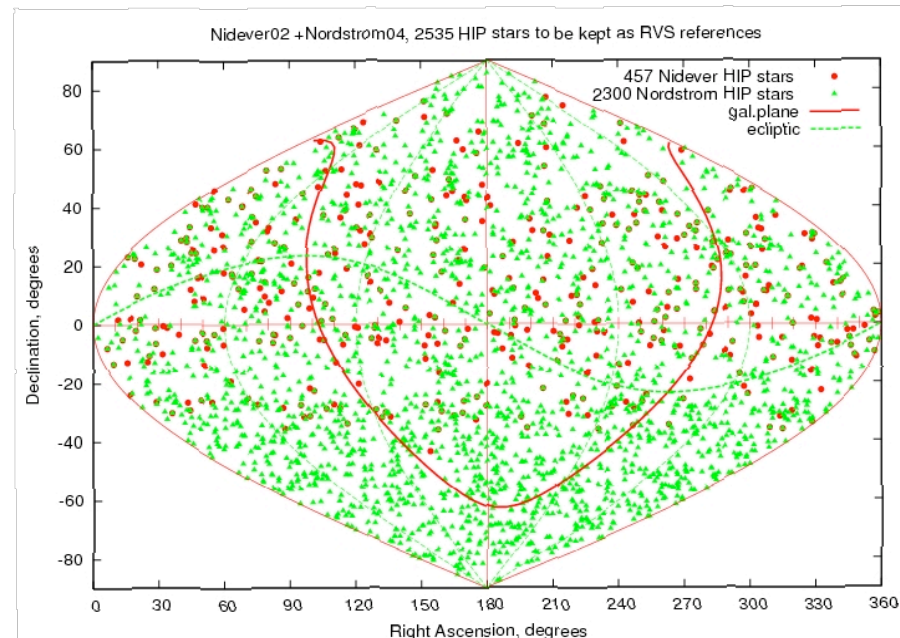
*Main requirements: HIP stable stars, error and dispersion on
 $RV \leq 0.3 \text{ km/s}$; $6 \leq V \leq 10$*

Lists examined:

- **Nidever02: 457 * kept of 782**
 - **Nordstrom04 revisited: 2300 * of 16682**
 - **Medeiros99: none kept (~ 100 possible)**
 - **Elodie Archive**
 - **More lists to be published soon**
 - **Search for other calibration stars (giants...) in a secondary list**
- } “minor list“

Our basic list: the minor list

- Nid: 457 *
- Nord: 2300 *
- Total: 2535 *
- Common: 222*
- Mean number of stars observed per day: 145 (simulation by F. Mignard over 1800 days)



RV comparison between Nidever and Nordstrom:

- Systematic differences shown at the past Cambridge meeting:
Source of problem = zero-point used by Nordstrom

-The new zero-point for the Coravel-Elodie data was defined in 2000;
Nordstrom04 published data are still in the old system.

=>New extraction of RVs for the Nordstrom stars going on in the
Geneva database, soon available.

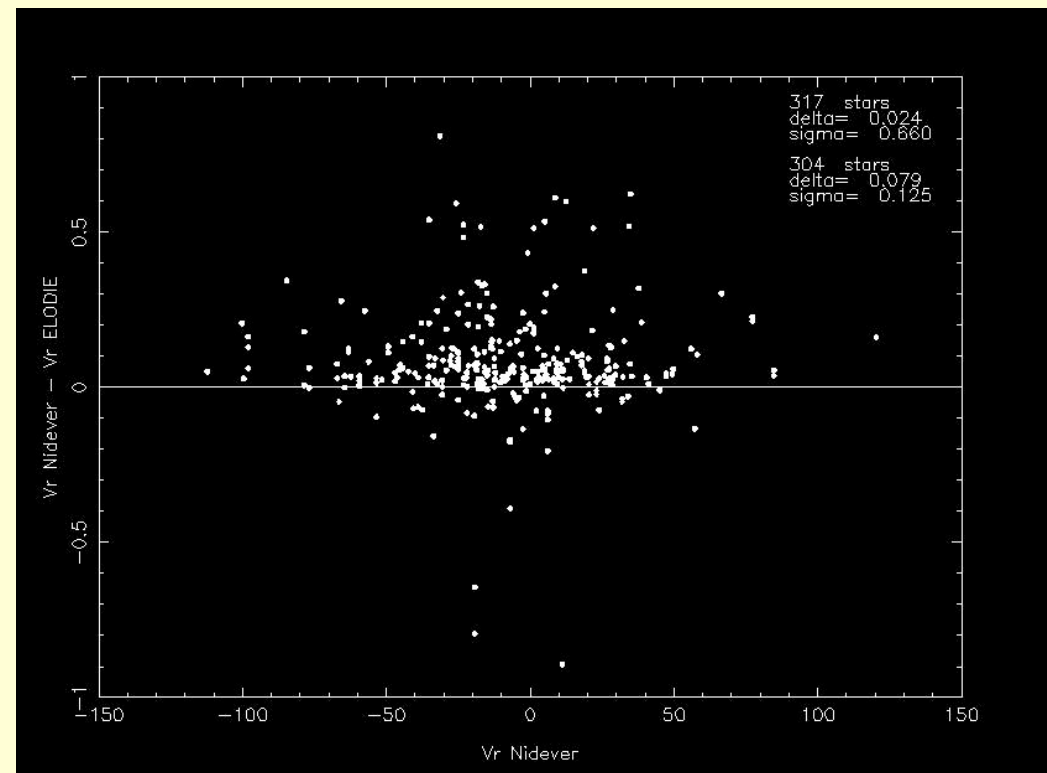
...more later!

Search in the ELODIE archive at OHP:

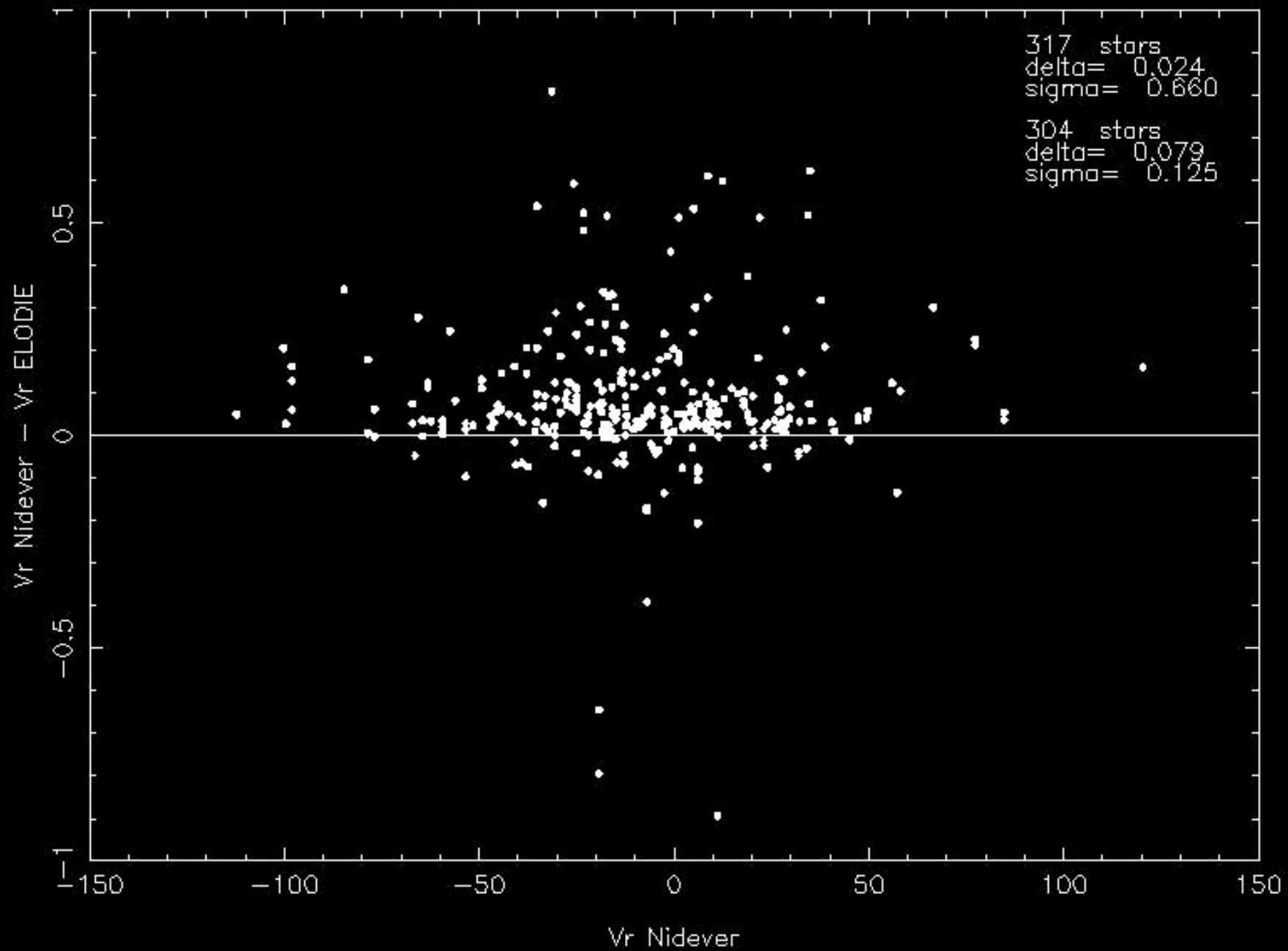
- Elodie archive : ~ 6000 different stars, ~ 30000 spectra (S/N>10).
- 23000 spectra with reduced RV; only half of them available.
- At least 317 Nidever stars in the archive, comparison of RV's:

.small offset (~ 0.08 km/s);
.non-negligible dispersion;
.outliers...

... to be continued



Elodie /Nidever, better view



Lists of potential calibration asteroids

- Selected asteroids have to belong to a compact set within a 3-D space defined by : m_V , *size*, *pm*.

List of priority 1 : $m_V < 10$ while crossing the FoV

There are ~100 asteroids with $V_{min} \leq 10$ at maximum of brightness. However :

- i) they will be observed near **quadrature** (Cf Hipparcos), not at **opposition** ;*
- ii) therefore many will be already too faint for «standards» while crossing the FoV.*

- Simulations (F. Mignard) of observations : statistics on the number of asteroids ($m_V < 10$) crossing the FoV.

These statistics depend on the launch date, the scanning law and initial conditions.

- To be done within CU6:

Simulation of asteroids in the RVS in order to estimate S/N of spectra and expected error on RV.

Goal = better determine the allowed values in the 3-D space (m_V , *size*, *pm*).

ASTEROIDS

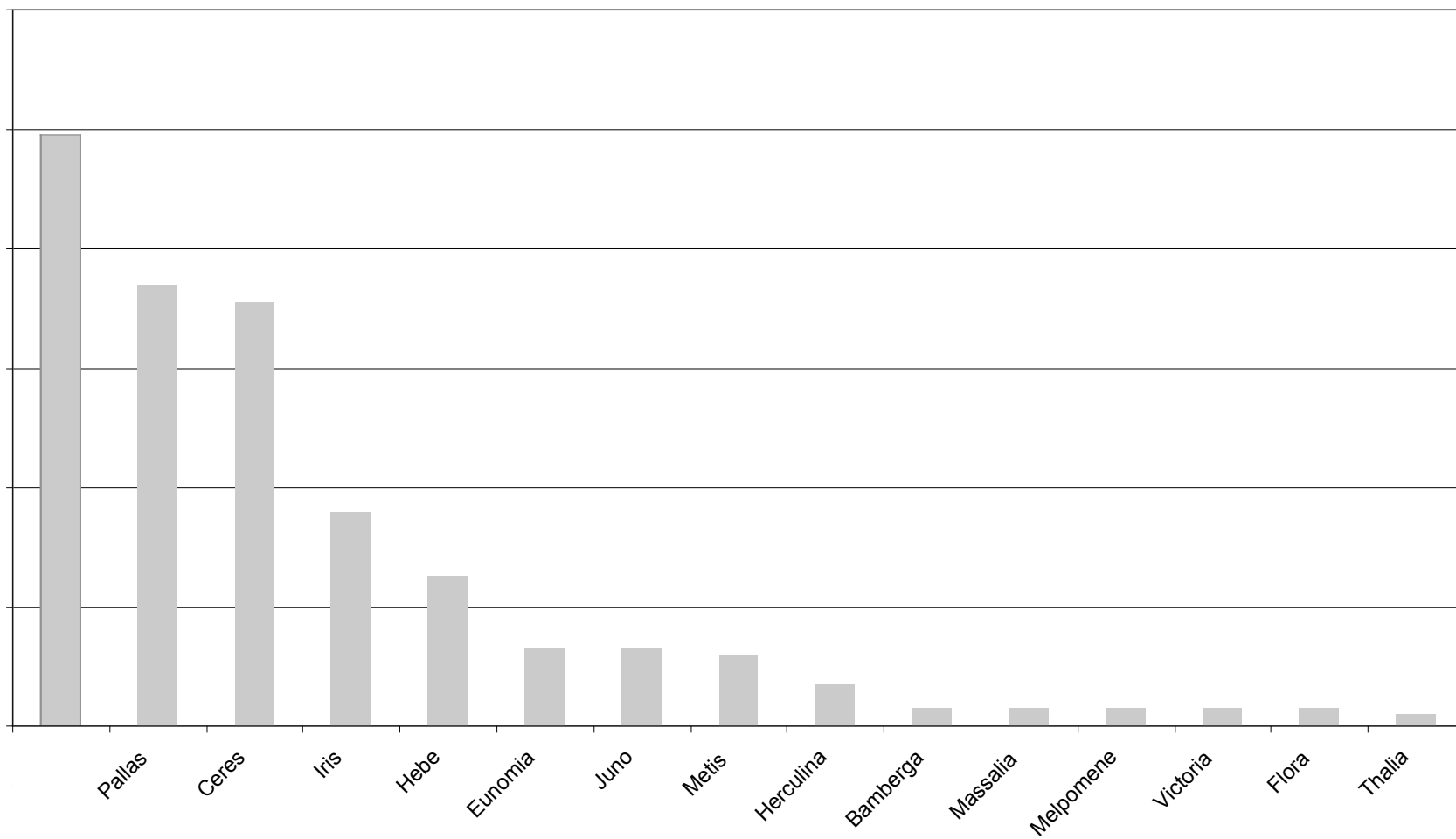
Average number (rate) of observations per day

Simulations by F. MIGNARD

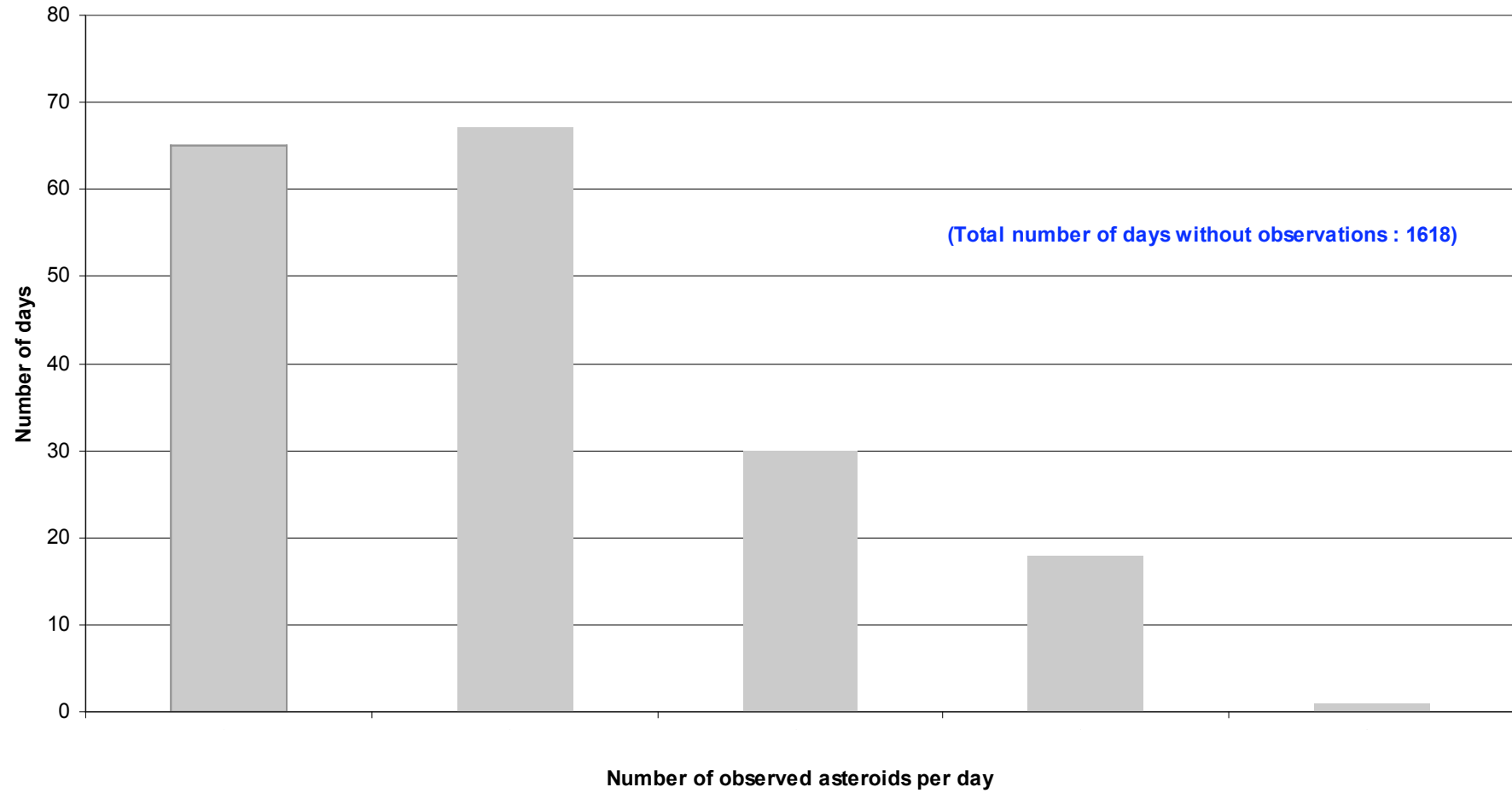
Observation period = 1800 days from 2010.0
(solar aspect angle : $\xi = 50^\circ$; old design)

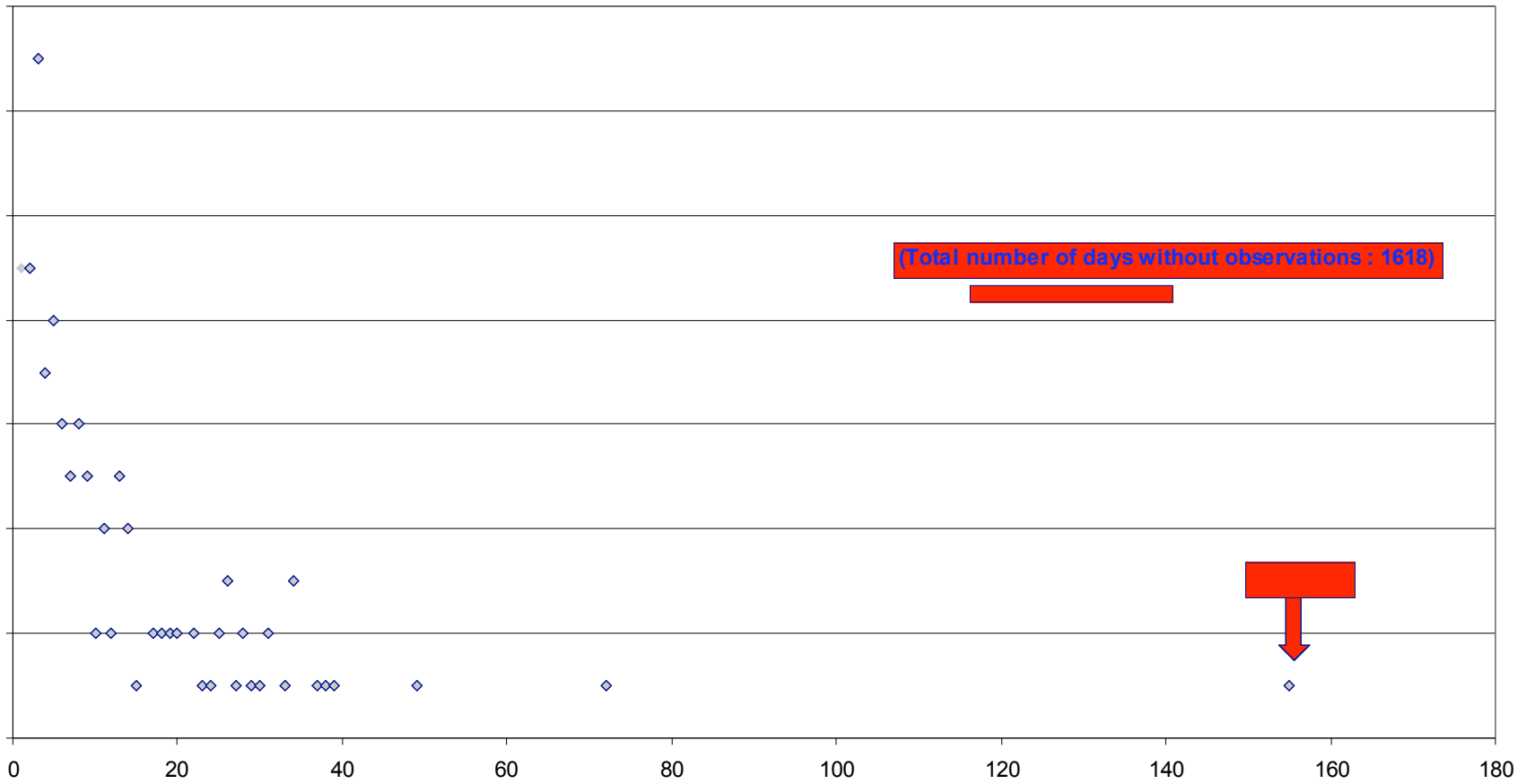
$V <$	rate	Number of days <u>without observations</u>
10	0.2 ± 0.7	1618
11	0.6 ± 1.2	1323
12	1.8 ± 2.1	737
13	4.6 ± 3.3	207
14	12.3	0

V<10



Asteroids with $V < 10$; 1800 days, start: 2010.0 per day





New ground-based observations:

- Main aims:

- check the stability of stars until the launch (and during mission?);*
- observe with the SAME instrument stars issued from different lists AND asteroids;*
- Assessment of the asteroids/stars RV zero-point consistency.*

-Planned:

- Periodic observations (each semester) at the T2m-OHP and T2m-TBL (Pic du Midi, France).*
- The new NARVAL spectrometer at TBL (starting very soon) will cover the RVS wavelength range.*

New ground-based observations, continued:

After the first encouraging trial by T. Zwitter at Asiago:

1st run at ELODIE (OHP), 15-20 Feb. 2006

- Stars in the basic list “ninor”: subset of 222 ninor common stars;
- Simultaneous observations of asteroids .

-Despite horrible weather :

18 stars (including 5 IAU standards);

7 asteroids (10 exposures)

RV were measured for all objects, although with low S/N.

More official organization of the group:

going on as a full work package;

will be useful for long-term telescope time applications.