

# **SW Measurements**

## **Ground versus Space instruments**

Alcatel Consortium

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M. Pick, C. Lathuillere and J. Lilensten

## **Ground-based observations for Sun**

- Forecasting, Nowcasting and Postevent analysis
- Clear distinction SW and research needs
  - Choice of instruments
  - Instrumental performances
  - **Selection** and priorities

## Sun General recommendations

- **24h coverage** **high priority to Space** even when possible from Ground
- **Established operational network**
  - **Development of identical and well-calibrated instruments**
  - **Coverage in longitude and latitude range (visible)**
  - **Climatic conditions tested for seeing** → **6 optical equipments**
  - **Financial aspect Ground versus Space not obvious**

## Needs for sun observations

- **Magnetic field**

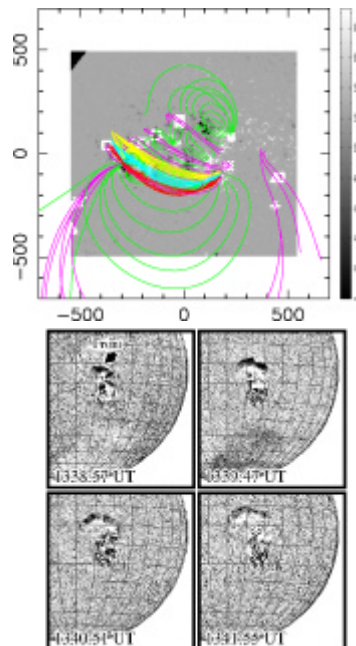
Forecast activity, onset,  
modelling (2", 5gauss, 15min)

- **Priority for space**

- **Halpna line and off**

Geoeffective CMEs  
Flares and eruptive filaments,  
Moreton waves (30sec)

- **High Priority for space**



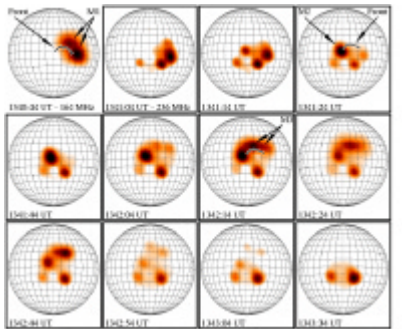
## Needs for solar radio observations

### High cadence and span huge range of altitudes

- **IMAGING**

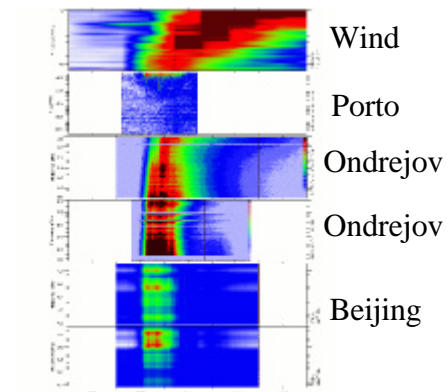
- disk and limb CME progression

Shocks, SEP, beams....



- **SPECTROGRAMS**

- Shocks, SEP, beams....



## Sun Existing networks

### B field and Halpha observations USA

- **GONG**

- 6 sites in 6 Longitudinal range B long,
- 87% coverage

- **SOLIS**

- One site: Vector spectromagnetograph and Halpha (2002)
- Two other ones recommended NAS/NRC report

- **ISOON US air force facilities**, will remplace SOON

- 4 sites: Vectormagnetographs and Halpha telecope ??

- **BBSO**

- 4 sites Halpha network, **Seeing ???**

## SUN Recommendations

- \* Full disk Há Complete existing network 6  
(1.1 ME) space
- \* Full disk B Complete existing network 6  
space
- Radiospectrographs Network 20GHz- 40 MHz 3  
(0.8ME)
- Radio imaging Network 2GHz- 70 MHz 3  
(7 ME) (FASR)
- \* Ground-based: Canary Island European Observatory

## Interplanetary medium

- **Muon network**

Forecast geomagnetic storms several hours in advance (CME signatures)

Gap in northern atlantic/european region **close by the Greifswald (if no 200 kE)**

- **Neutron monitor network**

Radiation doses (SEP, galactic CR)

- **IPS plus Tomography**

## Ground-based observations for Ionosphere-Thermosphere

Needed for **nowcasting** and **post-analysis**

To day operational models used

**GIC**

**Magnetometers**

**Orbitography**

**Indices**

Magnetic activity (3-h Kp, Dst)

(see **Menvielle and Paris poster**)

Solar activity (daily F10.7)

**Telecommunications**

**TEC or/and Fof2**

## Ground-based observations for Ionosphere-Thermosphere

- **Recommendation**

**Magnetometers**

**-Upgrading magnetic observatory network(gap  
above northern Asia and Russia) (60kE)**

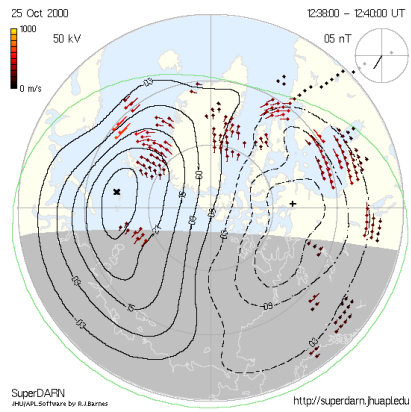
**TEC measurements**

**-Develop analysis of positioning data → TEC -  
Future Use GALILEO products**

**Ionosphere profile measurements**

**-Upgrade ionosonde network. Recommend SPACE  
Upper profile poorly known - Global coverage**

## Ground-based observations for Ionosphere-Thermosphere



- **Superdarn** for Future models
- **Convection electric field**
- **Recommendation**
  - **Operational 24 h a day**
  - **Develop SW capacity**