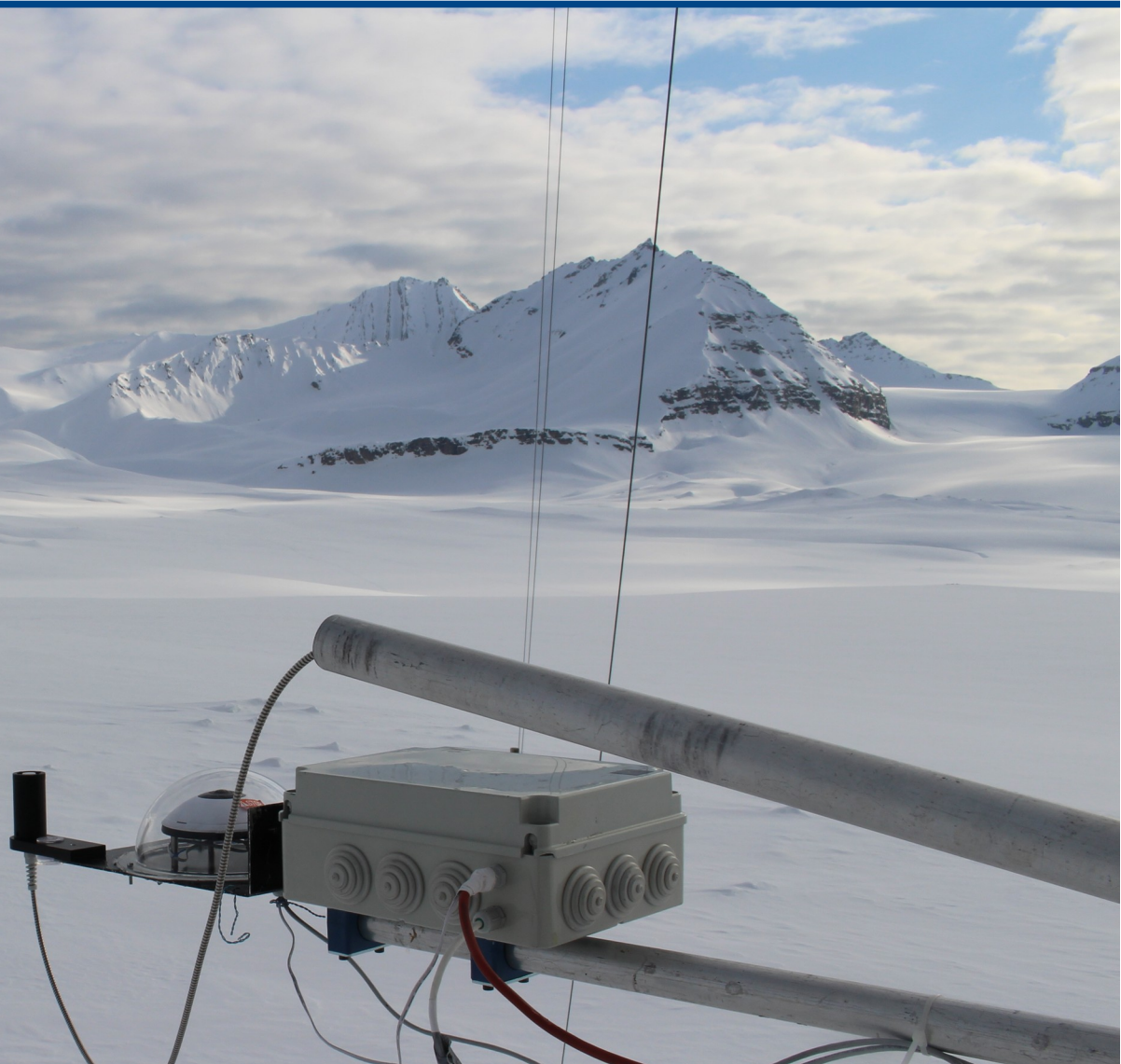


Continuous monitoring of spectral reflectance in Polar Regions (Ny-Ålesund and Dome-C)

Roberto Salzano

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Involved projects



Study of the Radiative Regimes over the Antarctic Plateau and beyond [STRRAP-b]



Involved people

Salzano Roberto
Salvatori Rosamaria
Esposito Giulio
Giusto Marco
Montagnoli Mauro



Lanconelli Chrisitan
Mazzola Mauro
Viola Angelo
Vitale Vito
Busetto Maurizio

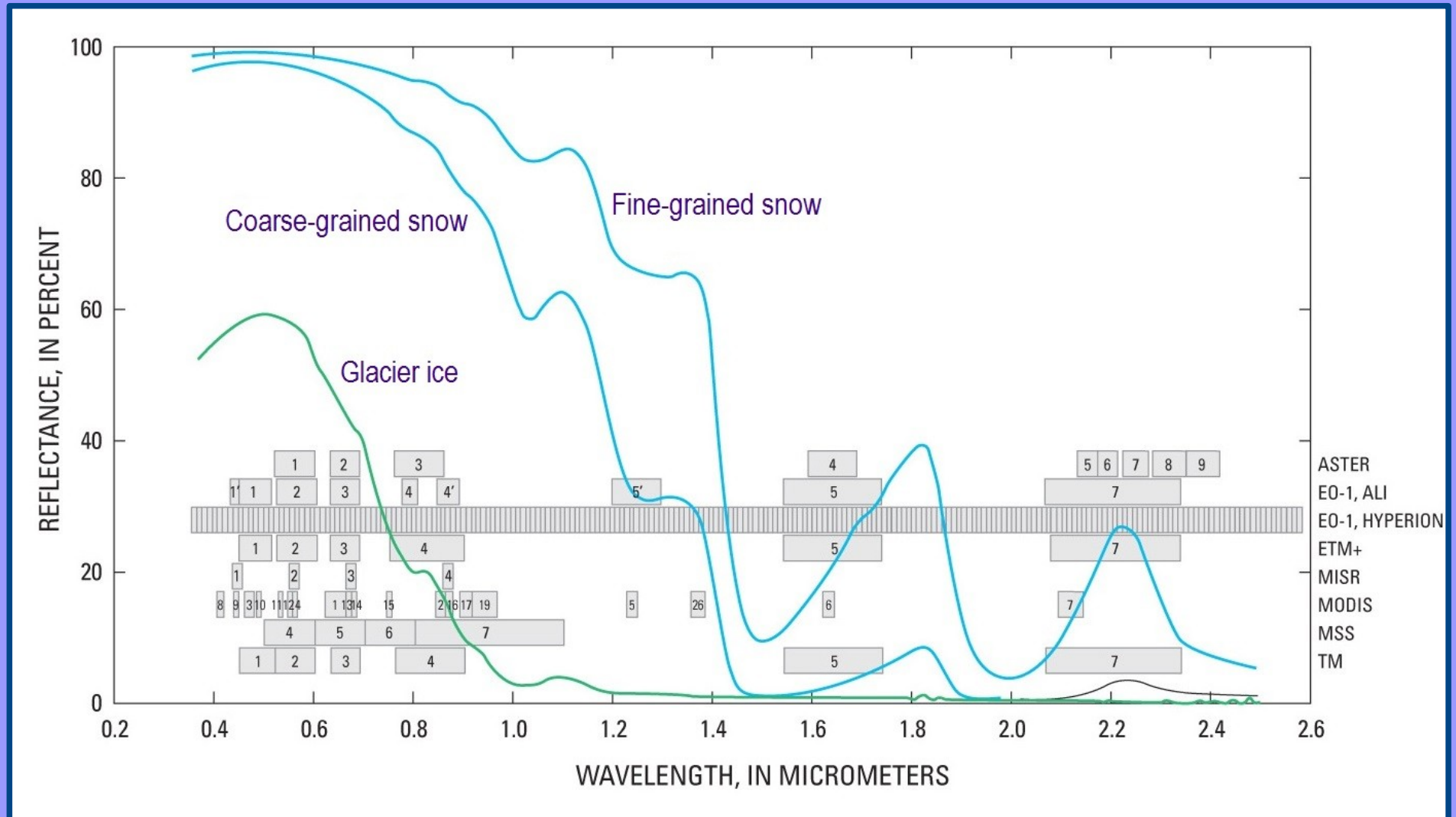


- Vis-NIR wavelength range
- Reduced man intervention
- Thermally stabilized
- Low power consumption
- Low cost
- Remote control

Why? In the visible and near infrared wavelengths, the optical properties of the snow are related to grain size and shape, to the ice absorption coefficient and to the presence of impurities, such as black carbon and dust.

Applications?

- ✓ Radiative modelling
- ✓ Snow metamorphism modelling
- ✓ Cal/Val of remotely sensed products



From Williams & Ferrigno (2012). <http://pubs.usgs.gov/pp/p1386a>.

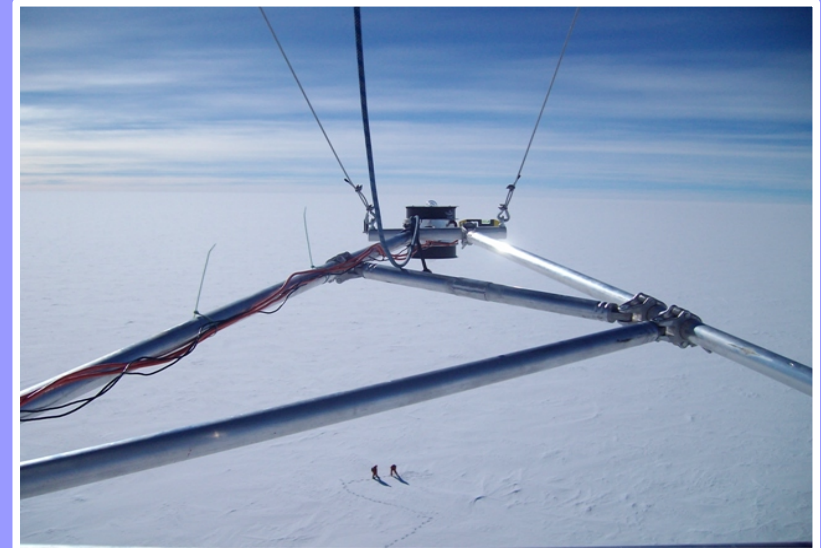
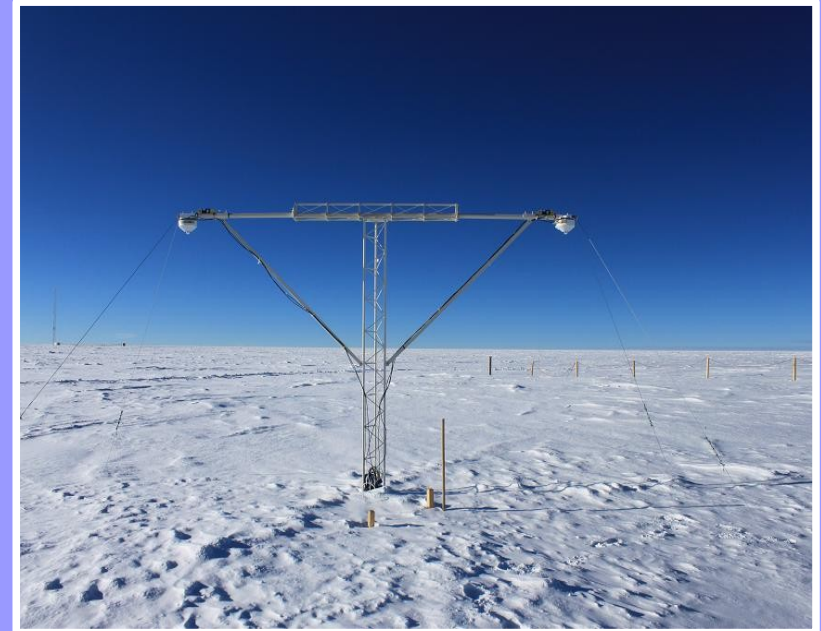


The Dirigibile Italia station includes the CCT Tower facility since 2009. The tower is 32m height and several instruments are installed for investigating the exchange processes at the atmosphere-land interface





The Concordia station is a BSRN site since 2006 and several instruments are aimed to estimate the radiative fluxes at the atmosphere-land interface. Different facilities are available such as the NSF Tower and the albedo rack.



Type: **Hyperspectral**

Geometry: **Bi-hemispherical**

Spectral Range: **350-2500nm**

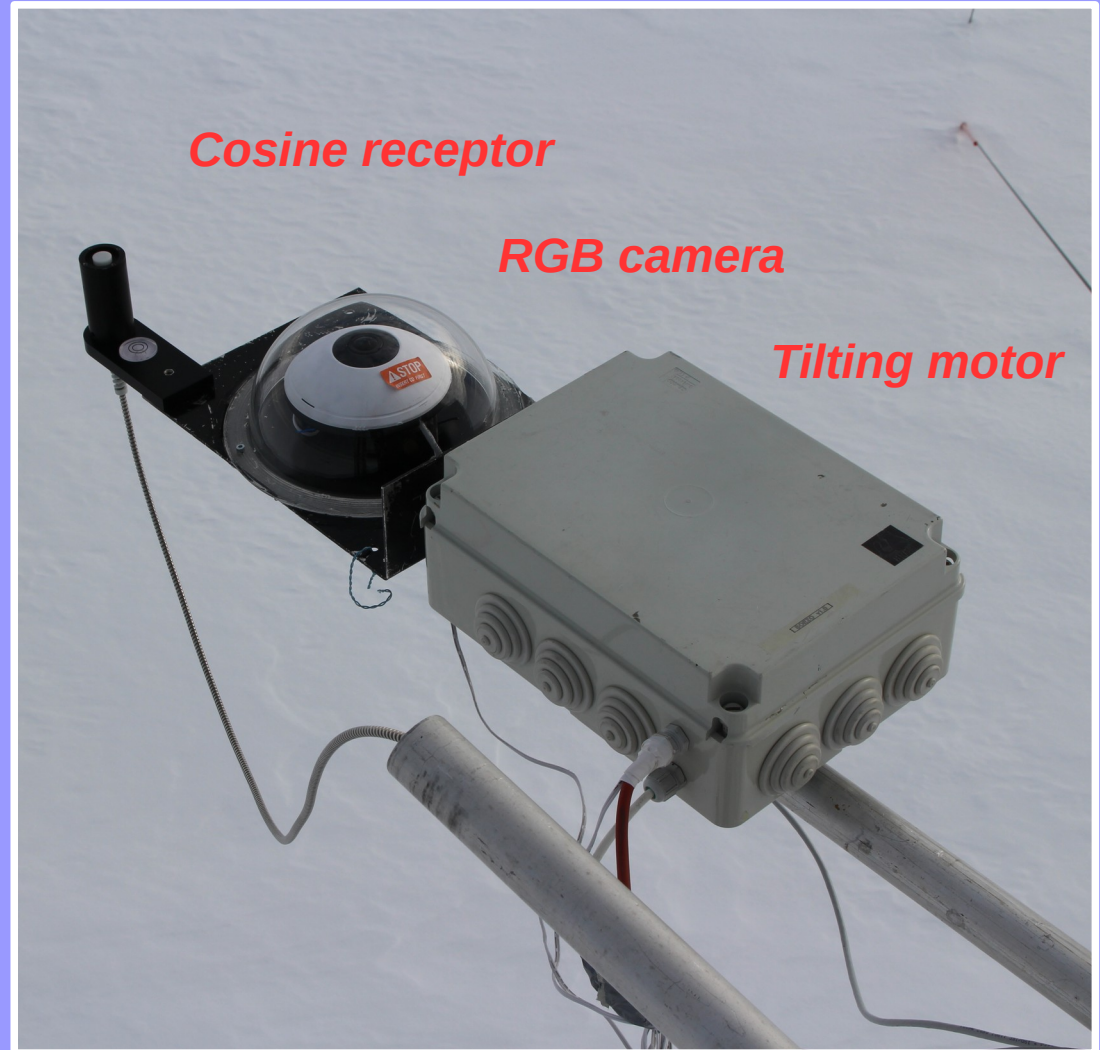
Collection: **Asynchronous**

Foreoptics: **Single**

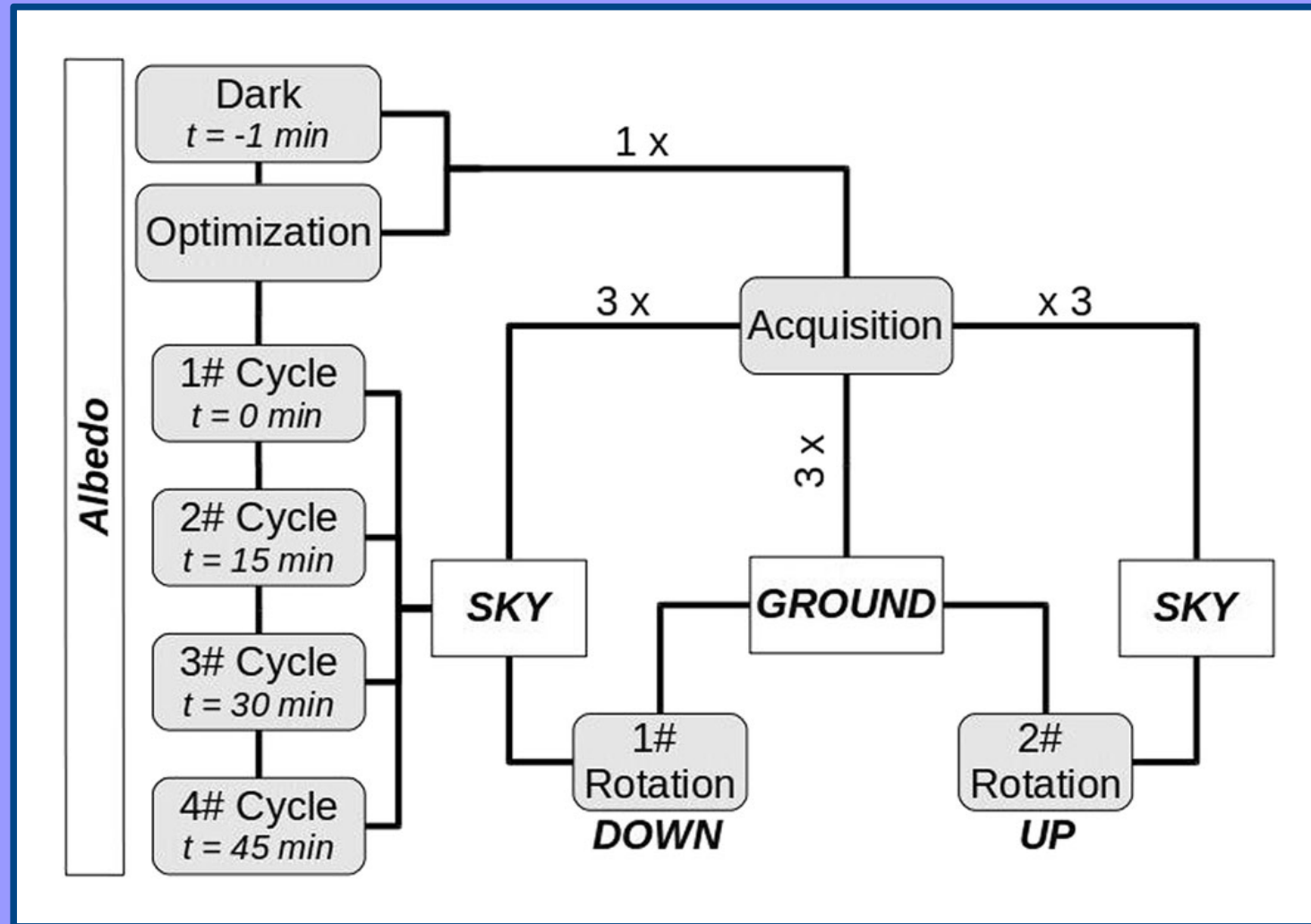
Rotation: **Yes**

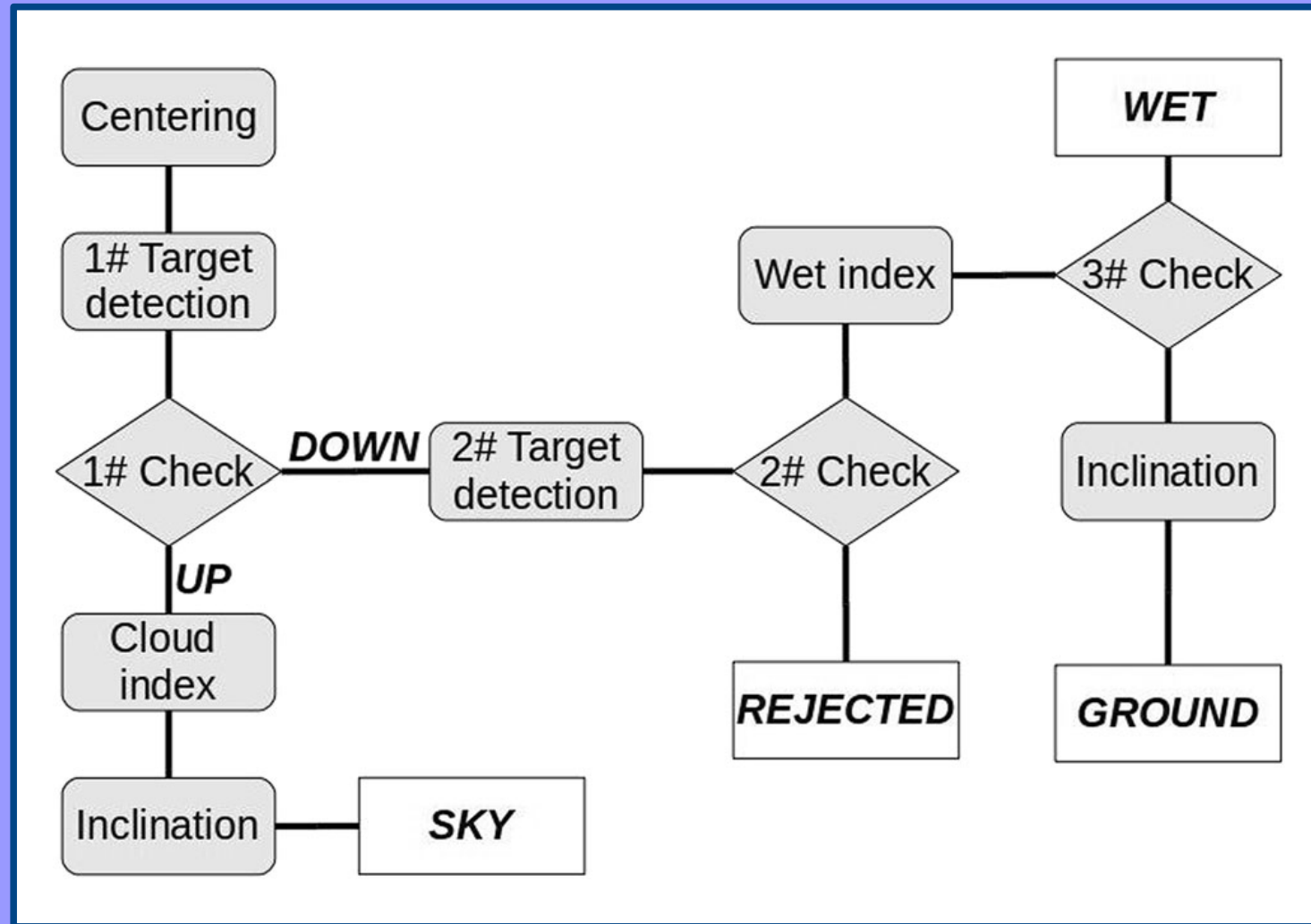
Hardware: **Fieldspec 3**

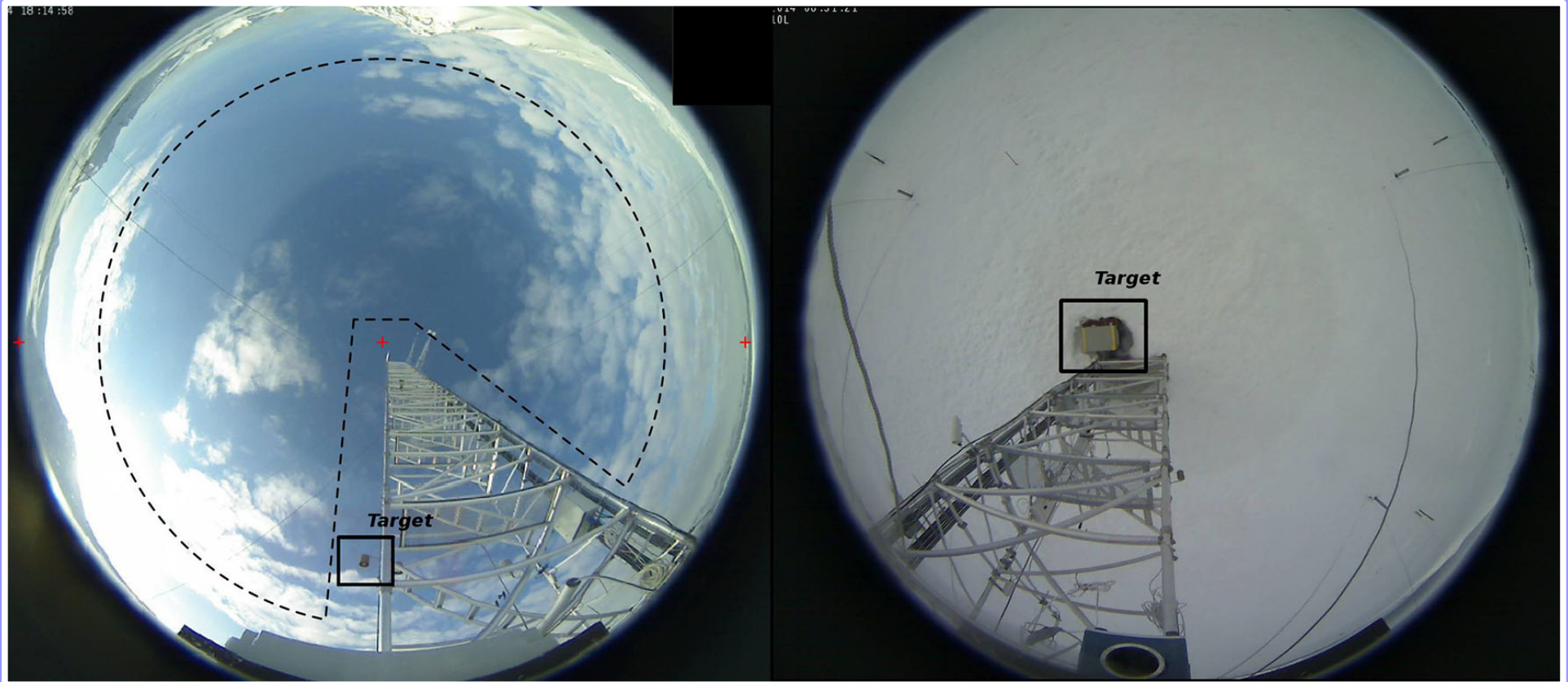
Software: **LabVIEW**

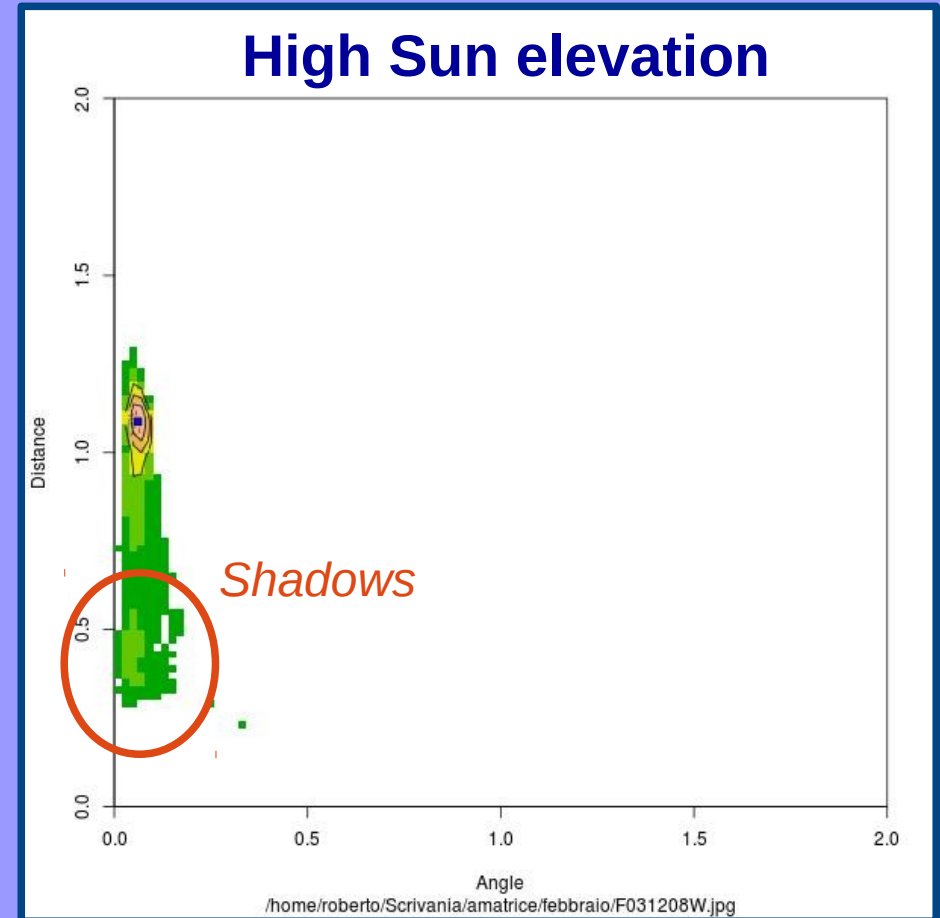
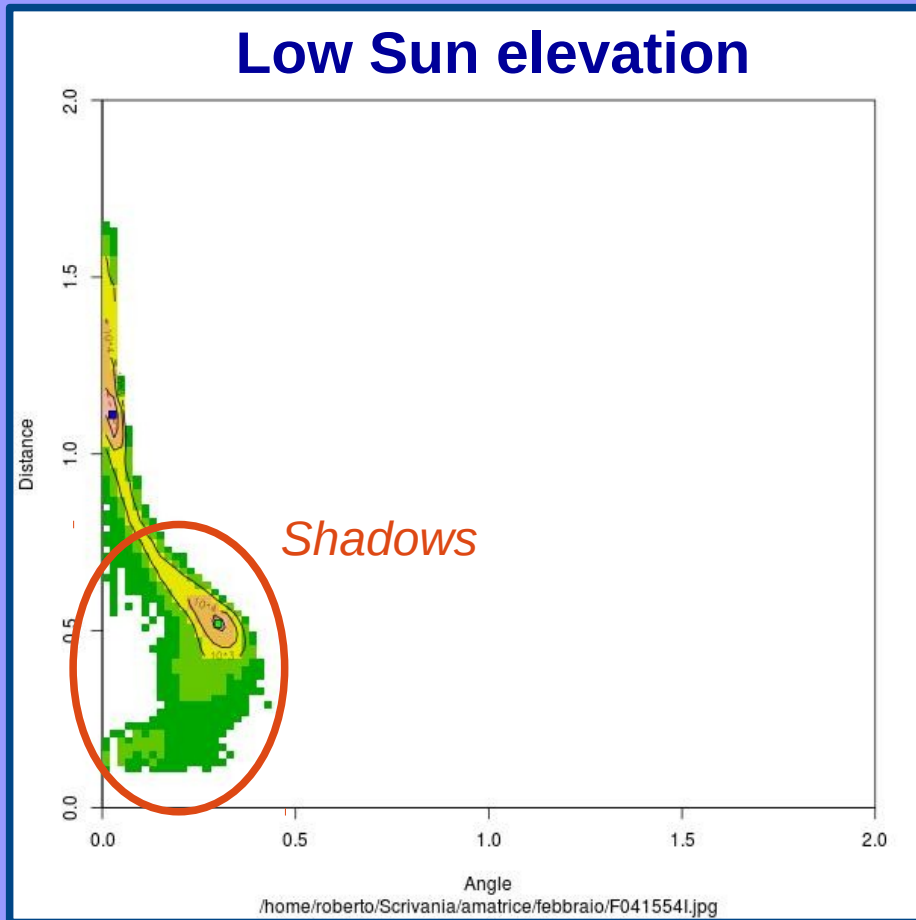


For further details Salzano et al (2016) Rend. Fis. Acc. Lincei DOI:10.1007/s12210-016-0513-y

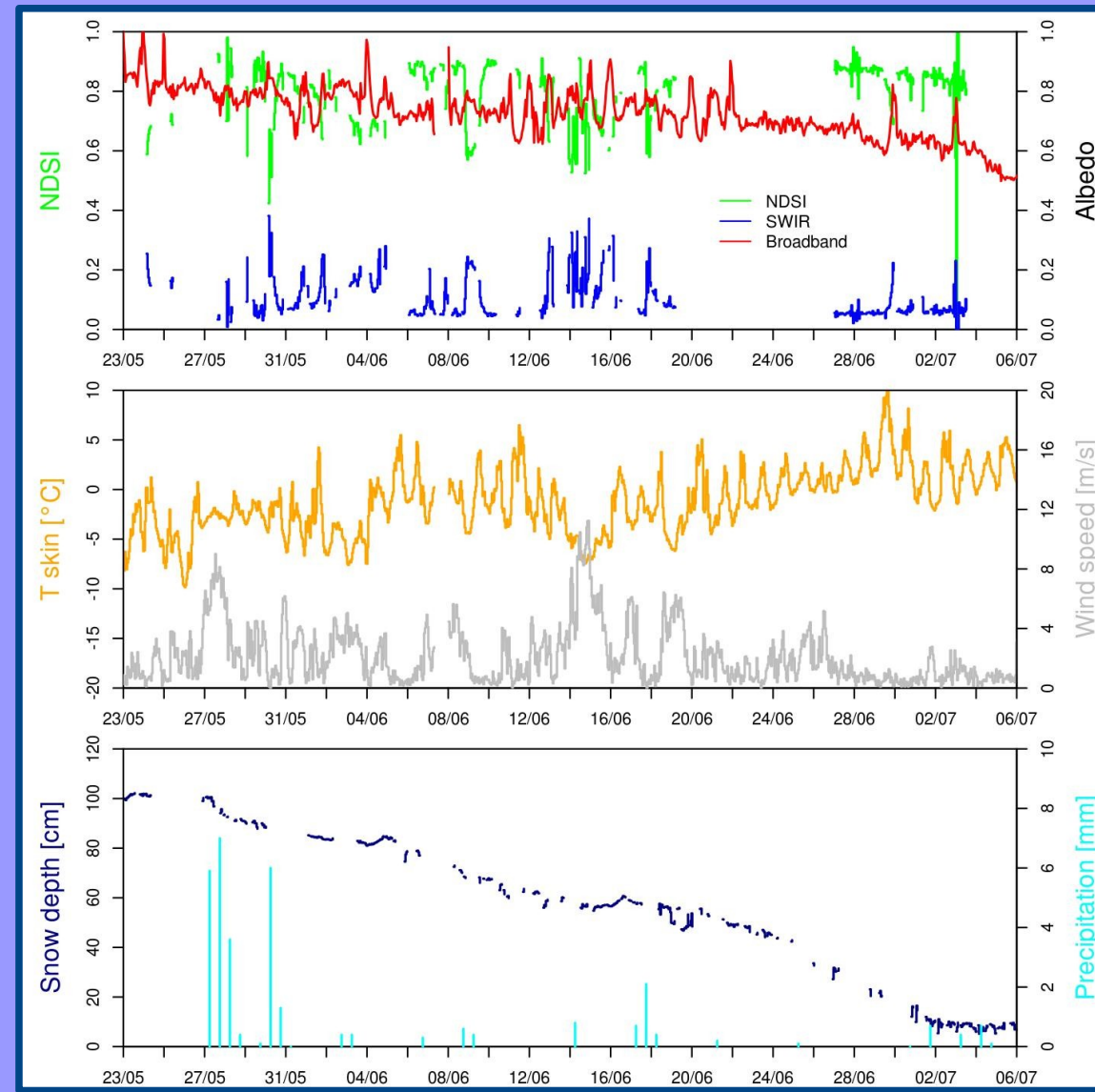
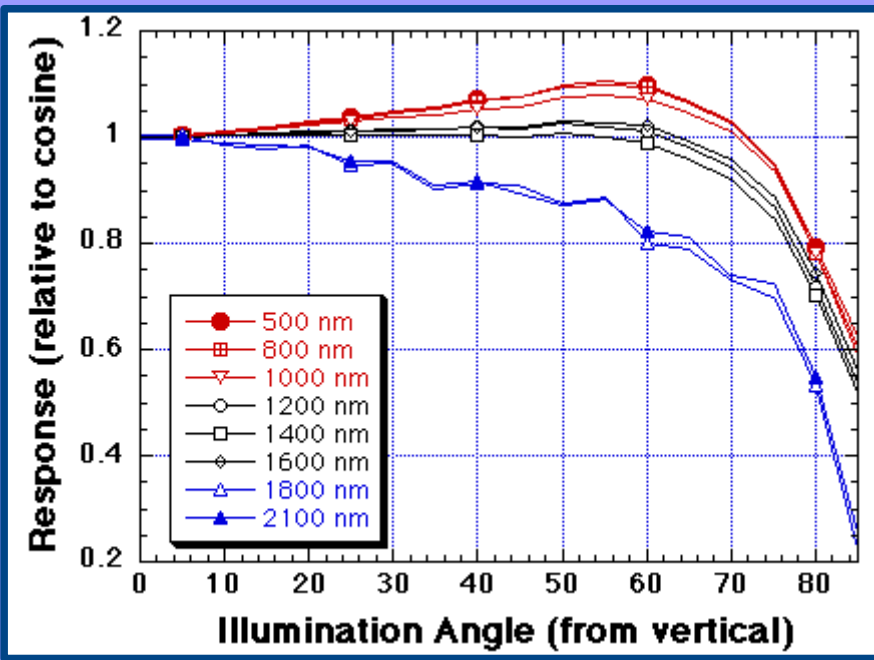








White-sky-albedo conditions occurred in 76% of available observations



Type: **Multi-band**

Spectral Range: **840-1260-
1640nm**

Geometry: **Bi-hemispherical**

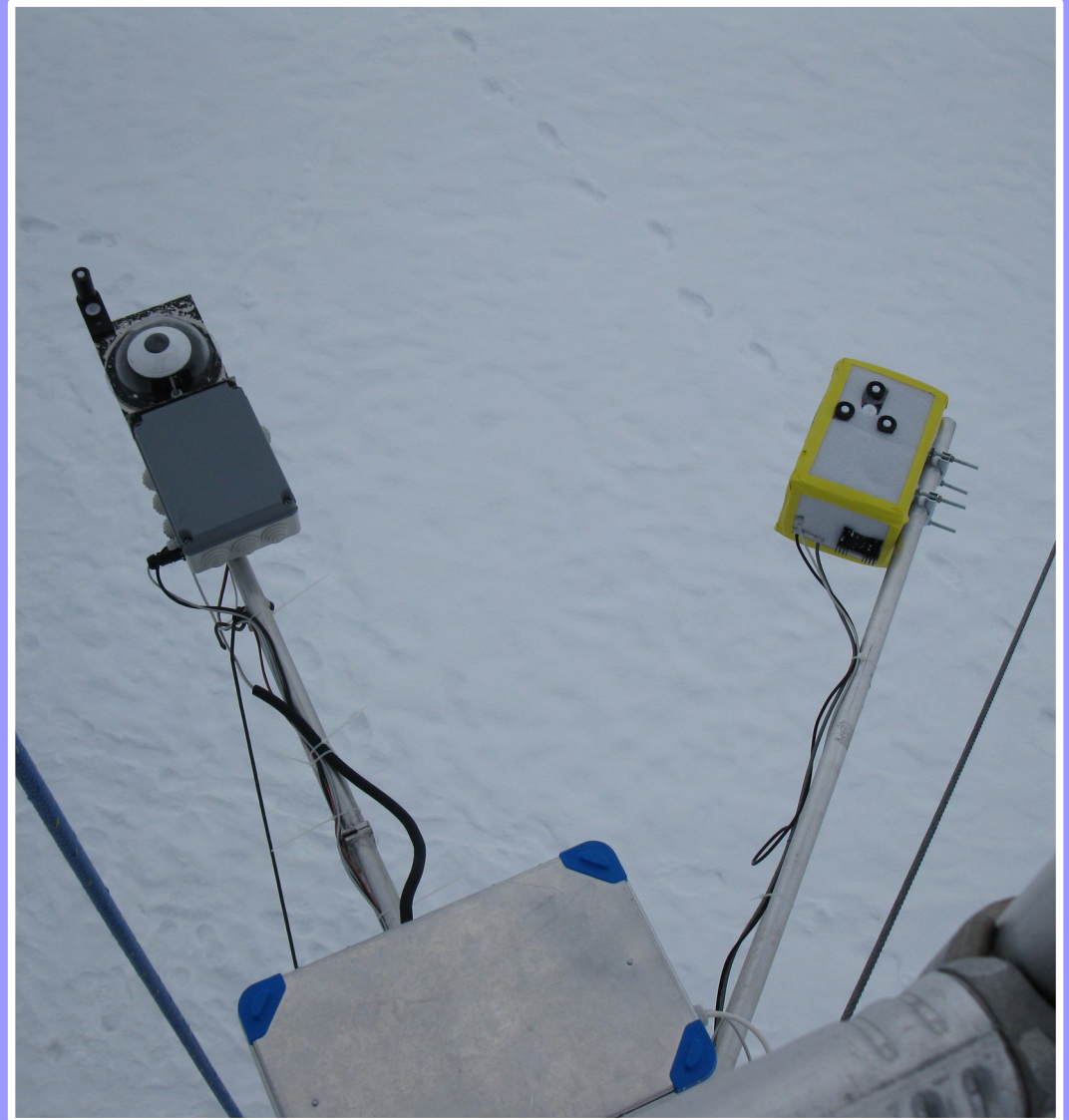
Collection: **Synchronous**

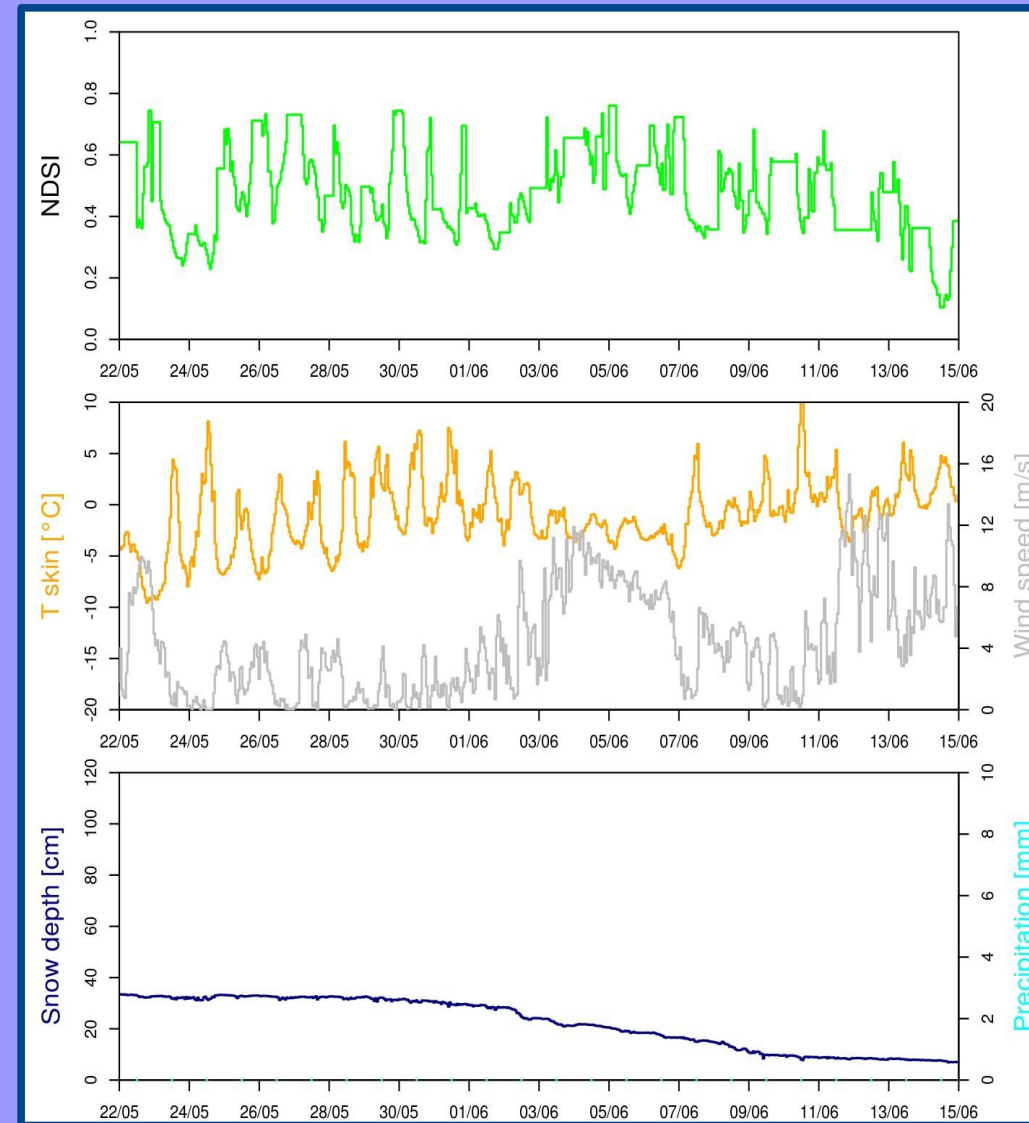
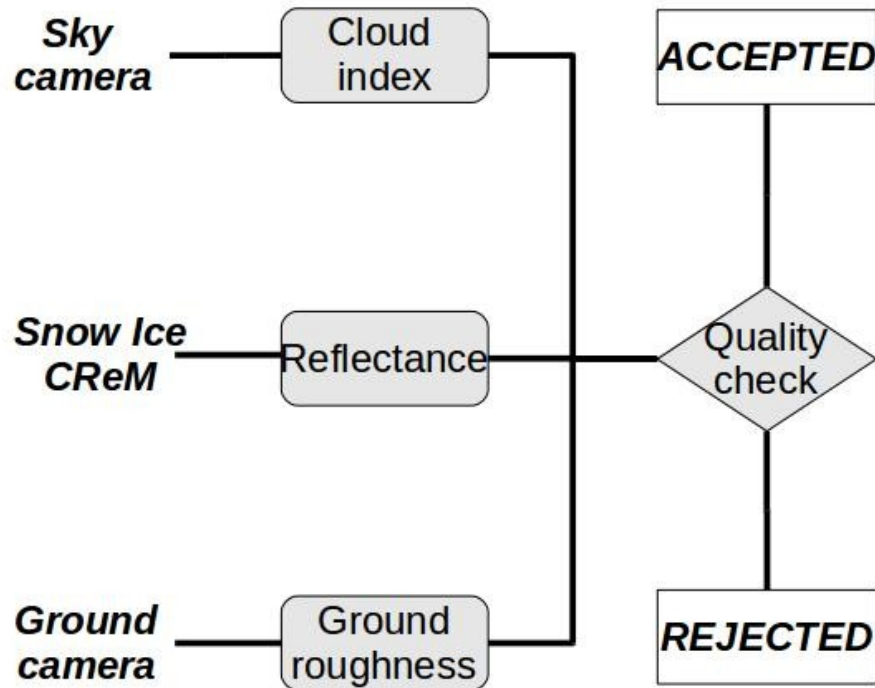
Foreoptics: **Six**

Rotation: **No**

Hardware: **Si and InGaAs
photodetectors**

Software: **Raspbian**





Type: **Hyperspectral**

Spectral Range: **350-1700nm**

Geometry: **Hemispherical**

/ Conical

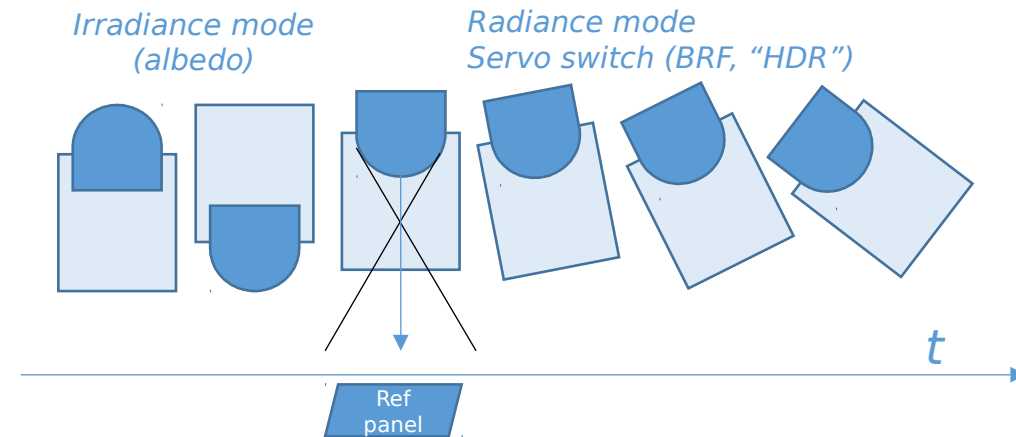
Collection: **Asynchronous**

Foreoptics: **Single-Sliding**

Rotation: **Yes**

Hardware: **Photon Control**

Software: **Raspbian**

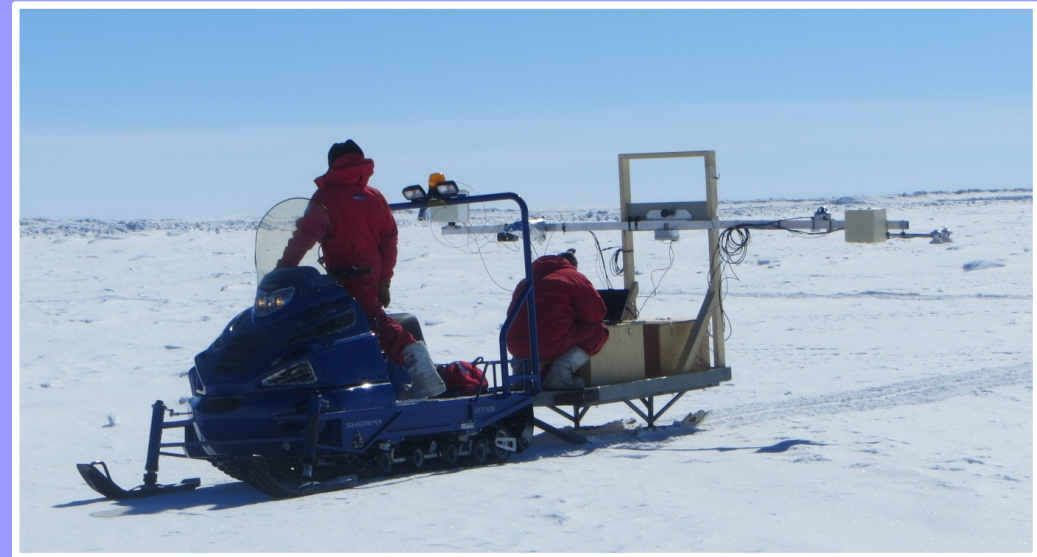


SPM-002-	A/AH	B/BH	C/CH	D/DH	E/EH	F/FH	NIR1700
Spectral Range	400-700nm	190-400nm	350-1000nm	200-850nm	200-1090nm	500-1000nm	900-1700nm
Blaze Wavelength	500nm	250nm	500nm	300nm	300nm	750nm	1050nm
Resolution 10μm*	0.4/0.8nm	0.4/0.6nm	0.7/1.9nm	0.7/1.9nm	1.1/2.5nm	0.7/1.4nm	-
Resolution 25μm*	0.6/1.0nm	0.6/0.8nm	1.2/2.1nm	1.2/2.1nm	1.9/3.0nm	1.2/1.8nm	3.4/4.0nm
Resolution 50μm*	0.7/1.0nm	0.7/0.9nm	1.4/2.2nm	1.4/2.2nm	2.1/3.1nm	1.4/1.9nm	5.0/8.0nm
Resolution 100μm*	1.4/1.6nm	1.4/1.5nm	2.8/3.3nm	2.8/3.3nm	4.2/4.8nm	2.8/3.1nm	11.4/11.7nm
Resolution 200μm*	2.8/2.9nm	2.8/2.9nm	5.6/5.9nm	5.6/5.9nm	8.4/8.7nm	5.6/5.8nm	-

Unstationary setup: Motor sledge

Roberto Salzano

- A sledge has been equipped with a series of instruments to measure (during MODIS overpass)
- Spectral Bi directional reflectance in the principal (containing the sun) and perpendicular plane of reflection
- Broadband incoming and reflected irradiances (SW and LW)
Hukseflux NR01
- Diffuse-ratio *deltaT SPN-1*
- Albedo in 3 spectral bands (Vis, 1240nm, 1640nm) *SnowICEcrem*
- Pan-Tilt (5 Hz)
- Surface temperature anisotropy (*thermal camera*)
- Surface roughness (*RGB camera*)





Thank you