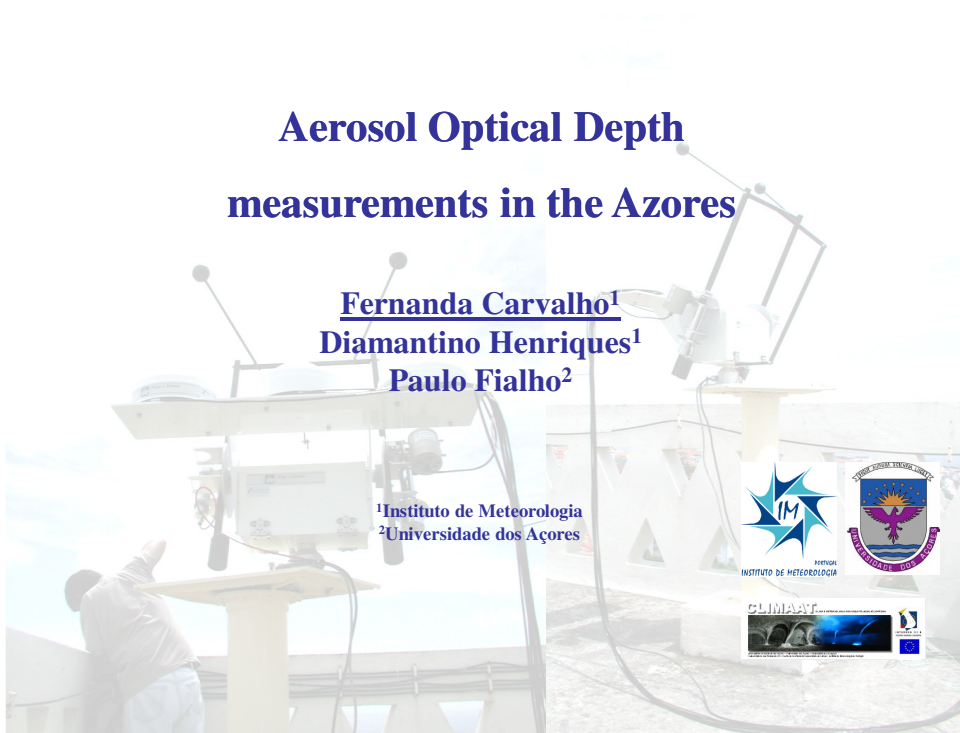


# Aerosol Optical Depth measurements in the Azores

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<sup>2</sup>Universidade dos Açores



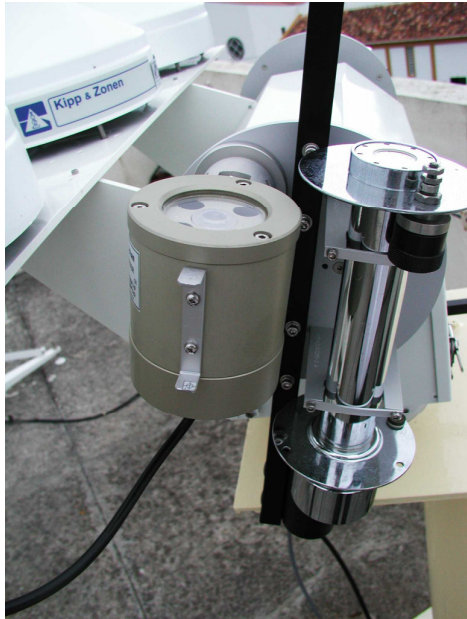
**GAW** Global Atmosphere Watch

**WMO** World Meteorological Organisation

**The José Agostinho Observatory,** located in Angra do Heroísmo town, is part of the regional station GAW network since 1992.

The very first global irradiance measurements in Portugal using conventional instruments and methods were done in this Observatory in 1937.





## Aerosol Optical Depth ( $\tau_{a,\lambda}$ ) computations

$$\tau_{a,\lambda} = -(1/m) \ln(E_\lambda / E_{0,\lambda}) - \tau_{R,\lambda} - \tau_{O,\lambda} - \tau_{H2O}$$

$$m = 1./(\cos(za*\pi/180.)+0.15*(93.885-za)**(-1.253))$$

$$mr = m*p/p0$$

$$vdo = 10000./cdo(\lambda)$$

$$\tau_{R,\lambda} = mr*7.994*(vdo**4.)/(9.26799e18-1.07123e9*vdo**2.)$$

$$\tau_{O,\lambda} = ao3(\lambda)*o3*mo3$$

$$mo3 = 35.0/(1224.0*(\cos(za*\pi/180.)**2)+1.)**.5$$

$$\tau_{H2O} = 0.3285*aH2O(\lambda)*(w+(1.42-w)*.5)*m/(1.0+20.07*aH2O(\lambda)*m)**0.45$$

## Aerosol Optical Depth ( $\tau_{a,\lambda}$ ) computations

### (Cont.)

Wavelength (nm)	412	500	675	862
Extraterrestrial const (E0)	3034	2477	2462	2565
O3 absorption coef. (aO3)	0.0000	0.0294	0.0391	0.0000
H2O absorption coef. (aH2O)	0.0000	0.0000	0.00037235	0.010629

- Precipitable water (w): 2.0 cm
- Total ozone (o3): Brewer observed nearest value

## Data acquisition and processing

**Acquisition system:** DTK500

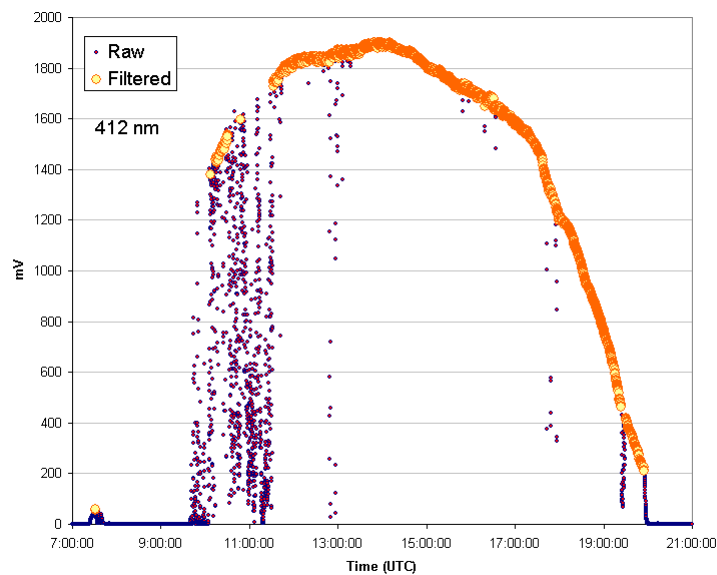
**Integration:** 5 s (avg;std)

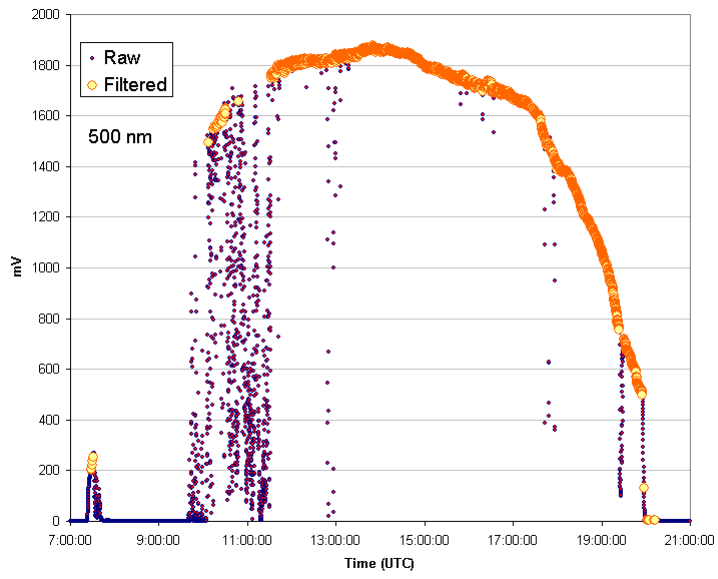
**Filter:** data with:

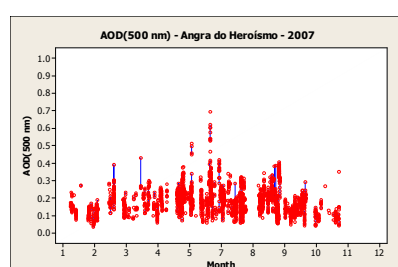
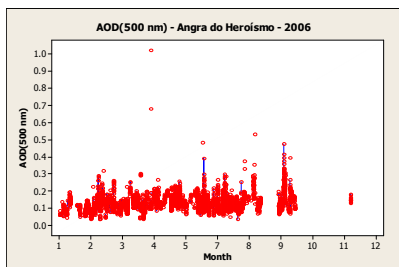
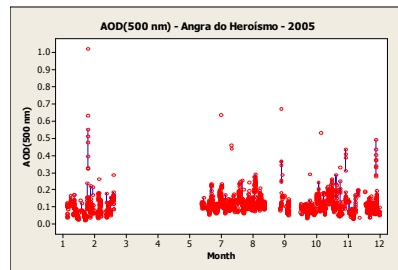
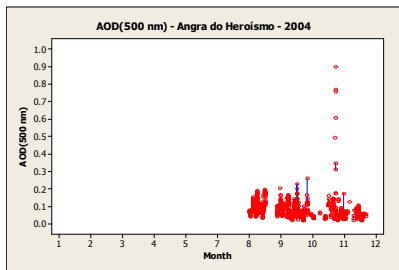
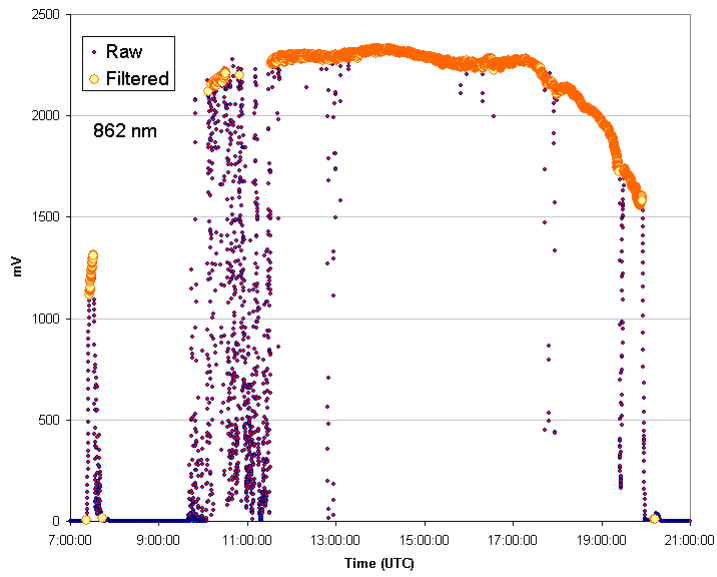
- signal < night background (zero);
- signal noise: std/ avg > 0.001
- night readings (za >90)

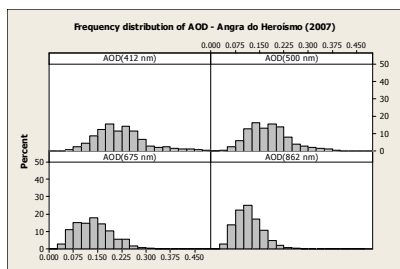
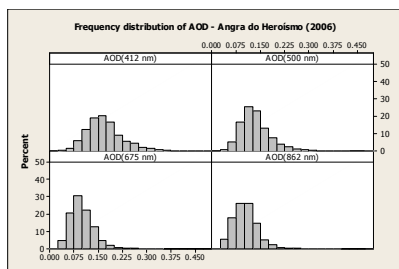
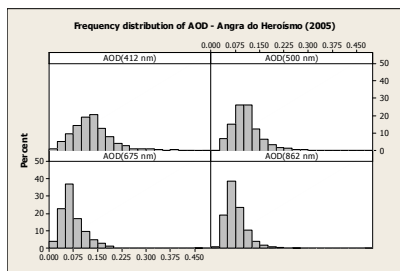
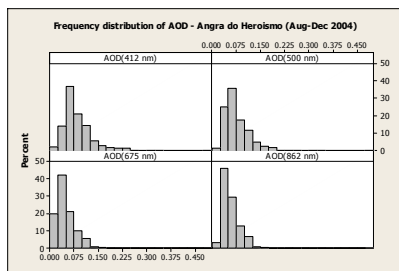
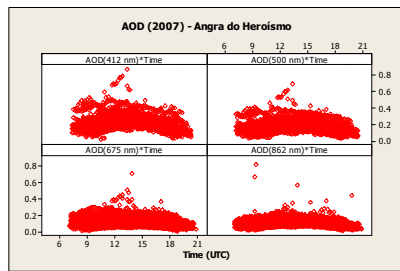
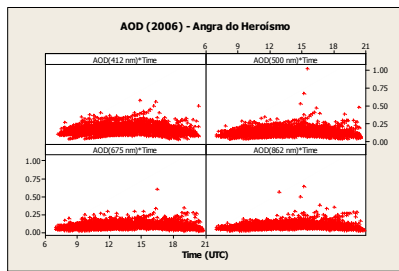
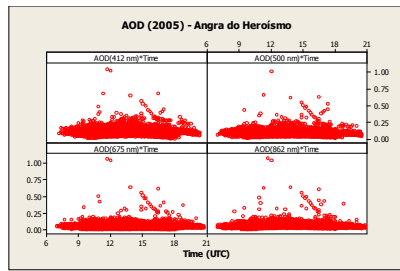
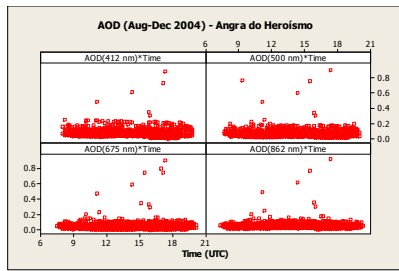
should not be considered.

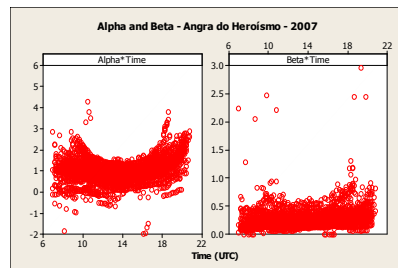
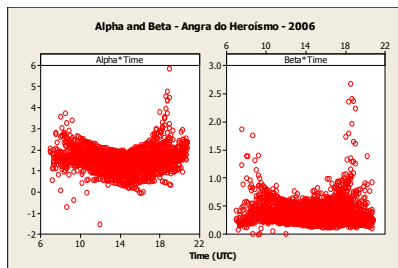
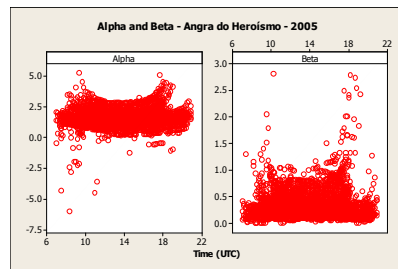
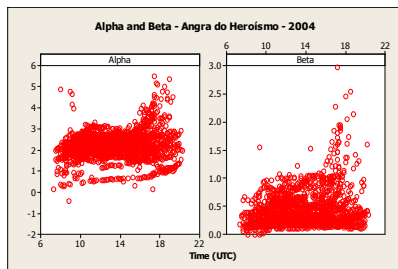
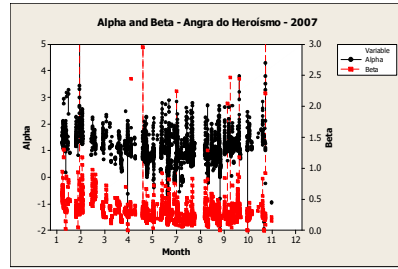
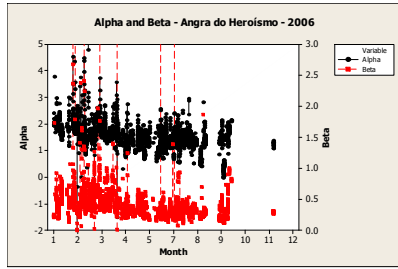
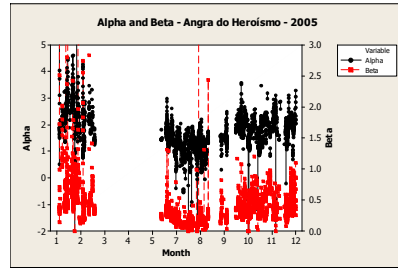
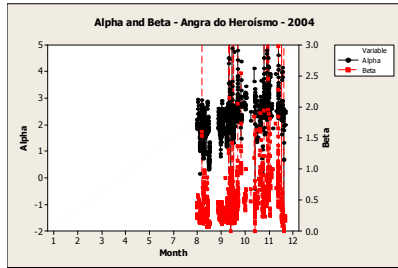
- **10 minute AOD averages** computed **only** with  $n \geq 30$  readings

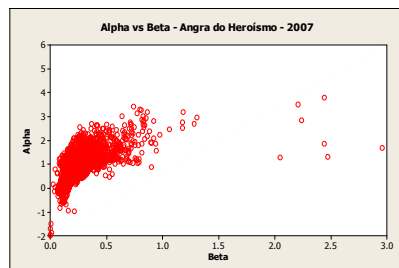
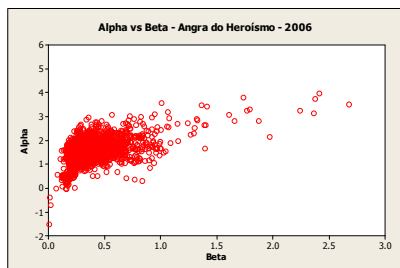
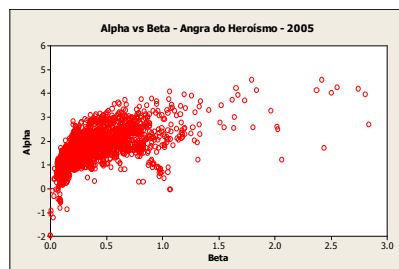
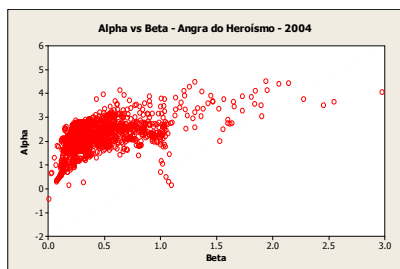
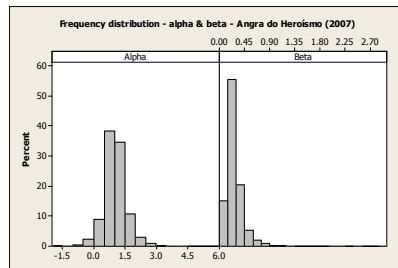
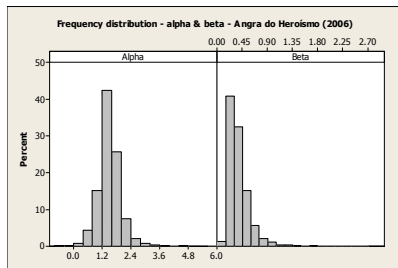
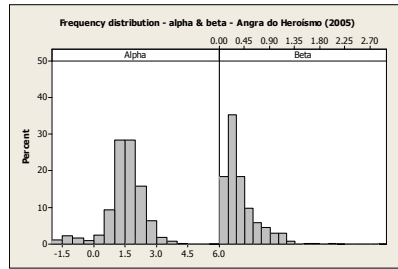
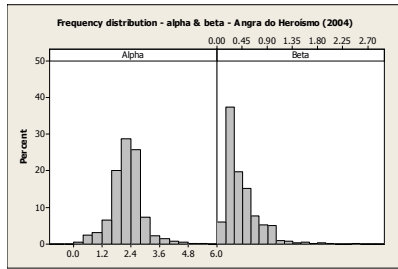


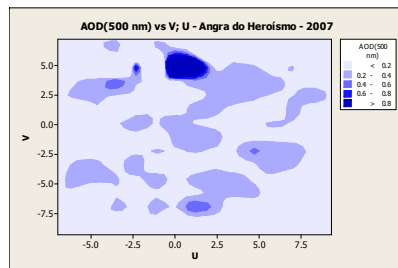
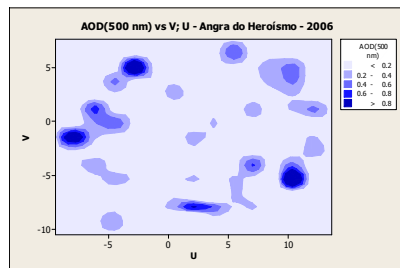
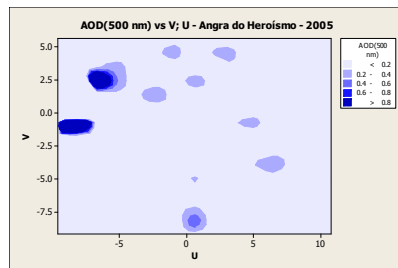
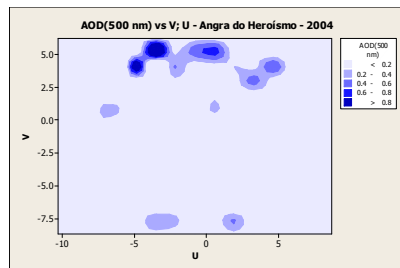
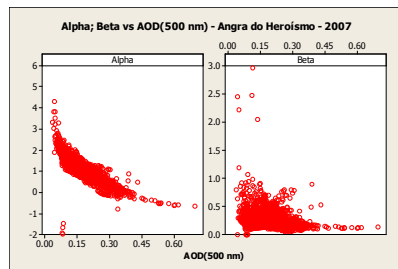
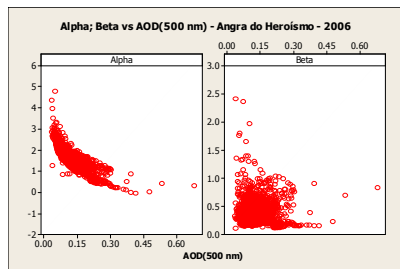
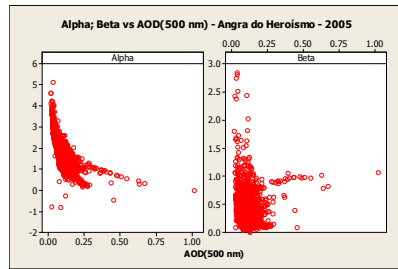
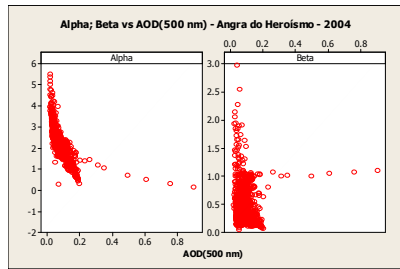






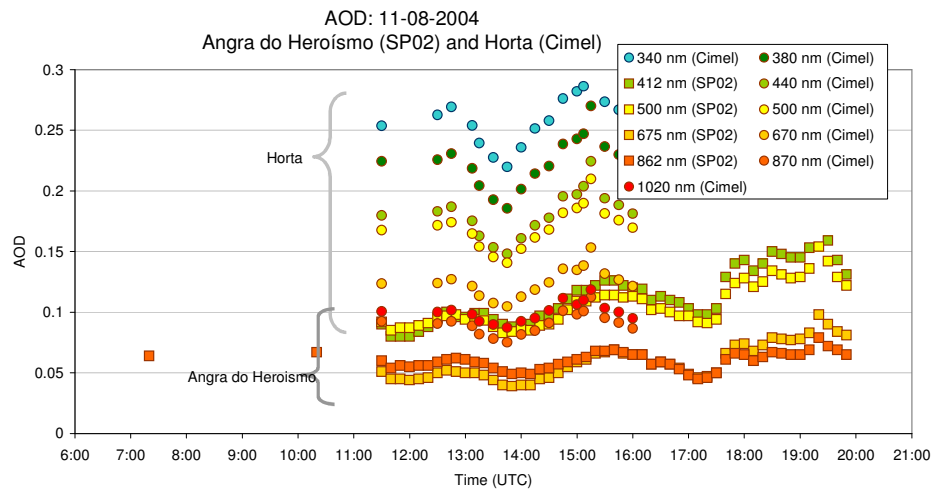
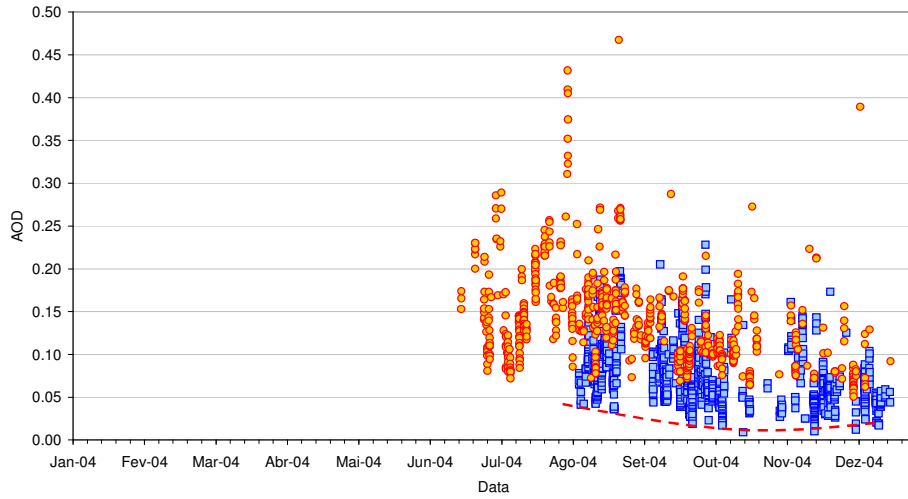


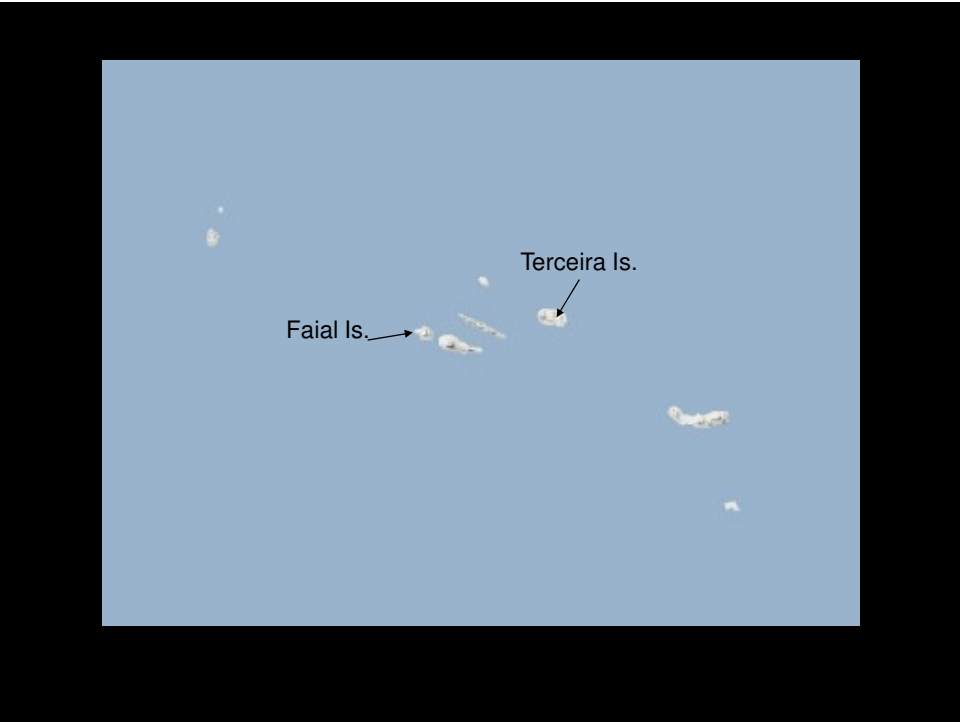


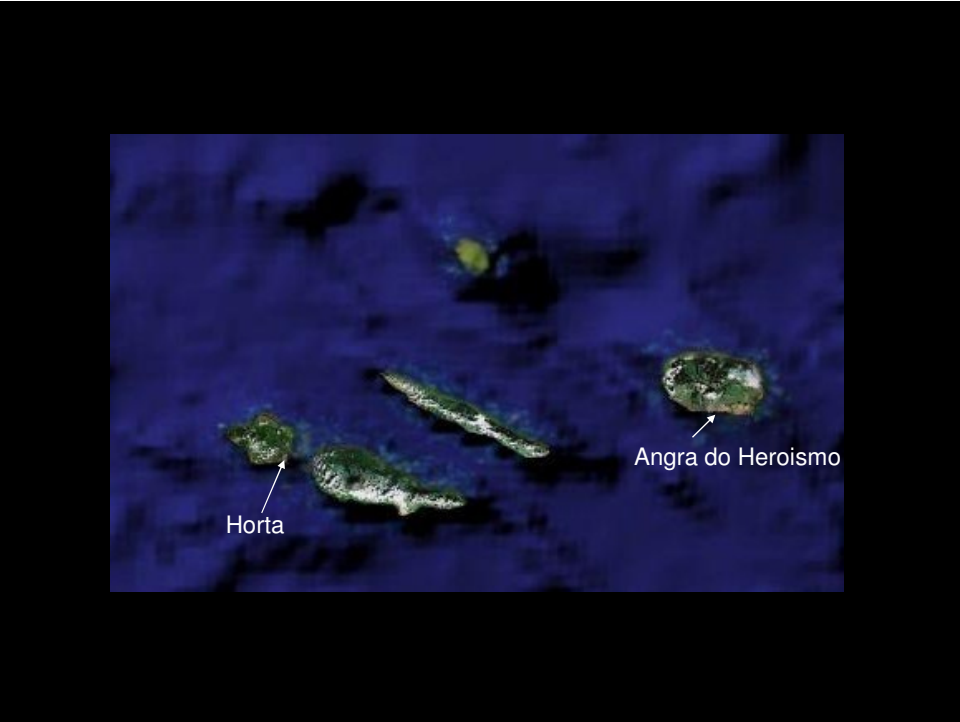


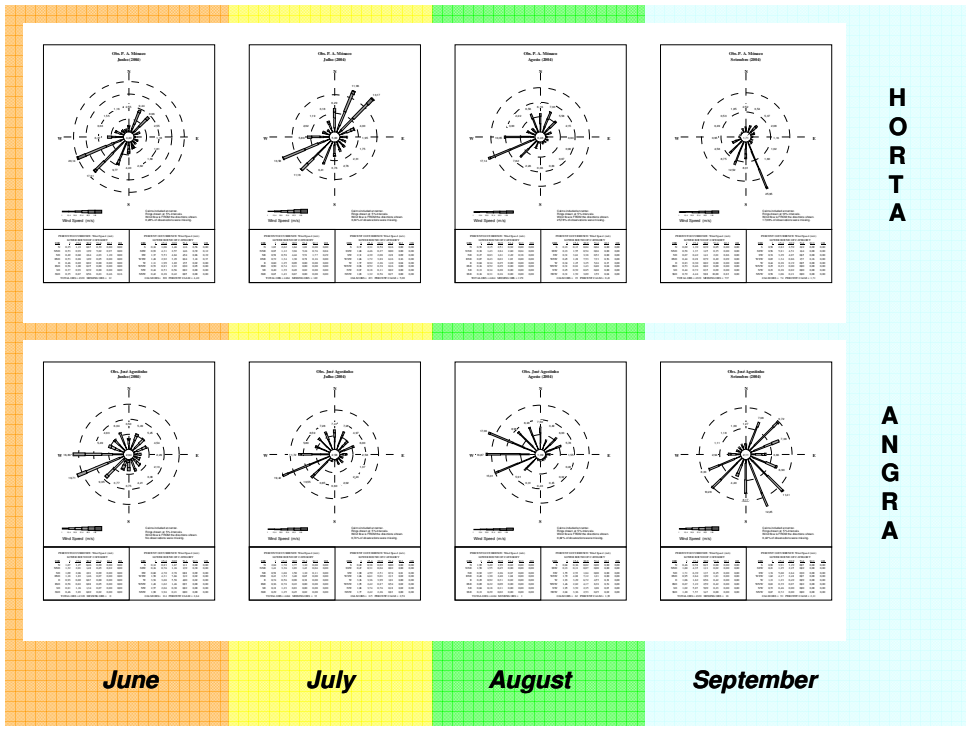
### AOD @ 500 nm – Azores 2004

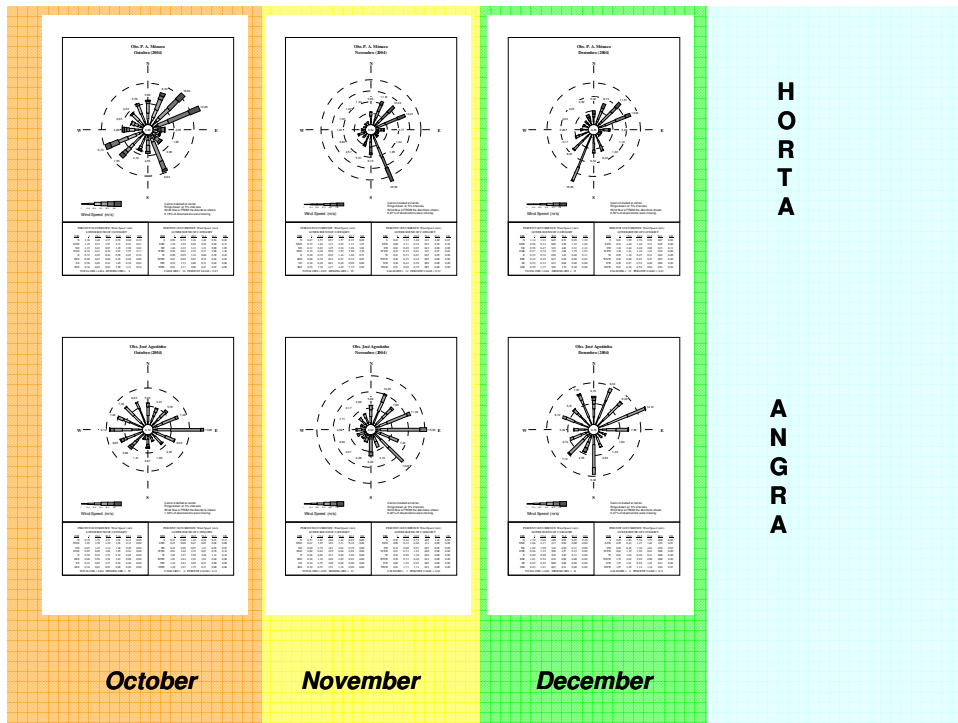
- Cimel (AERONET/Horta)
- SP02 (AZONET/Angra do Heroismo)











## Acknowledgements

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