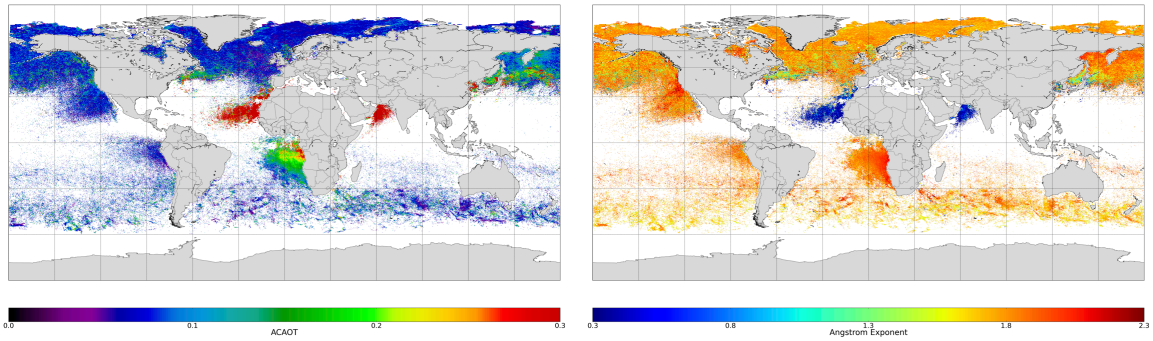
The operational algorithm developed for the POLDER instrument for aerosols above clouds proceeds as described by *Waquet et al.* [2013a]. The "single pixel method" allows the retrieval of the Aerosol Optical Thickness (AOT) above liquid water clouds. The method also provides the Ångström exponent, a parameter indicative of the particles size. The polarized signal of liquid clouds is characterized by a large peak at a scattering angle $\Theta \approx 140°$ called the cloud bow and a small amount of polarization at side scattering angle (i.e. $\Theta < 130°$). Aerosols above clouds affect polarization by creating a signal at side scattering angles and reducing the cloud bow intensity. These two effects are the basis for the retrieval of aerosol properties above clouds from polarization. The method consists of a comparison between POLDER measurements at 670 and 865 nm and precomputed polarized radiances with a Successive Order of Scattering code. An aerosol model is chosen from the 7 models considered by the algorithm (6 small spherical models for the fine mode and one non-spherical coarse model for dust) with a complex refrative index of 1.47-0.01i for both wavelenghts. Results are subjected to several filters in order to improve their quality: data must be well fitted, clouds have to be homogeneous and both cloud edges and cirrus are rejected according to criteria based on POLDER and MODIS products. Filtered AOT are then aggregated from 6 km × 6 km to 18 km × 18 km and pixels with a standard deviation of the AOT larger than 0.1 are excluded in order to prevent cloud edge contamination. More details about the algorithm, filters and results are provided in the papers of *Waquet et al.* [2013a & 2013b].



(a) (b)

Figure. (a) Above Clouds Aerosol Optical Thickness (ACAOT) retrieved with POLDER/PARASOL (at 865 nm) and **(b)** Ångström exponent. Mean values for 3 months (JJA 2008). (source : Global analysis of aerosol properties above clouds, Waquet et al., 2013b).

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