Cape Verde is located in an area of massive dust transport from land to ocean, and is thus ideal to set up sampling devices that will enable the characterization and the quantification of the dust transported from Africa. Mineral dust produced from windblown soils and deserts is one of the largest contributors to the global aerosol loading and has strong impacts on regional and global climates, long-term climate trends as well as marine and terrestrial ecosystems.

Mineralogical phases identified include various silicates and aluminosilicates, carbonates, sulphates, phosphates, oxides and hydroxides. Iron hydroxides, such as lepidocrocite and goethite, and carbonates, such as calcite and siderite, are the most discriminating phases, allowing to differentiate 3 subsets. On the contrary, silicates, such as quartz, feldspars and phyllosilicates, do not show any particular tendency, being ubiquitous and generally on small amounts.

The identification of the main sources and origins of the particles sampled in the archipelago is been carried out by integrating complementary tools such as Principal Component Analysis, Positive Matrix Factorization, Chemical Mass Balance, Multilinear Regression Analysis, Air Mass Back trajectories analyses, meteorological data and particle size segregate analysis.

characterization and prediction of biomass pyrolysis products

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Environmental and social concerns, energy security and fossil fuel prices are driving increased R&D and technological interest on the utilization of renewable energy. In particular, the thermochemical conversion of biomass has been actively discussed over the past few decades as a route for producing heat, electricity and synthetic fuels in a sustainable way. Aiming to accelerate the transition from fossil fuels to renewables, a number of pilot and industrial plants were demonstrated around the world to convert biomass via pyrolysis, gasification or combustion processes.

Biomass is an organic, carbon-based solid fuel with high volatile matter content. The fuel undergoes rapid decomposition when exposed to temperatures above 250ºC, forming a huge set of gas species and a non-volatile residue, called char or charcoal. Such a thermal degradation is called pyrolysis (or devolatilization) and is an important stage of fuel conversion in thermochemical processes. The characterization of this stage is of major importance in the case of biomass fuels in result of their high volatile matter content. The pyrolysis mechanism involves a great deal of physical and chemical transformations (e.g. dehydration, depolymerization) and hence the detailed description of the process is challenging. However, for engineering applications it is often sufficient to describe the ultimate yields and the properties of the pyrolytic products.

In this work, literature data on these issues has been screened and structured, constituting a guide on the general behaviour of biomass pyrolysis. The collected data covers a range of conditions with practical interest for thermochemical applications. Moreover, an empirical model to predict the distribution of pyrolytic products was proposed. The model is suitable to be integrated in comprehensive reactor models simulating pyrolysis, gasification or combustion processes, being an important tool to further develop the biomass conversion technologies.