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Cycles of selected elements in the frame of Globalization and Global Change in the environment of Tenerife (Canary Islands, Spain)

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The Laurel Forest is an important and sensitive ecosystem with particular element cycling mechanisms. On Tenerife the distribution is straitened to some parts in the north, north-west and northeast. The NE trade wind ensures a permanently humid climate in the north. Major urban and industrial development is centred on Tenerife, and as a touristy hotspot the Island is exposed to heavy air traffic. Furthermore, the short distance to the African coastline and, therefore, to the Sahara, contribute a regular influence of African Dust emissions. In summary, Laurel Forest is exposed to different climatic conditions, variations in lithology and soils, and aerosols caused by local anthropogenic emissions, Saharan dust, and sea spray.

The present study aims to understand geogenic and anthropogenic element transports of K, P, N, and organic components between soils and Laurel Forest. In addition, the element contribution from the aerosols such as the Sahara dust has to be quantified to understand the rock – soil – vegetation coupling system. The Sahara dust as one of the important aerosols has been studied by various researchers (Bustos et al., 1998; Rodrıguez, 1999; Torres et al., 2001; Viana et al., 2002). Viana et al.,(2002) quantified the impacts of African dust outbreaks for Tenerife and Gran Canaria, after the interpretation of the PM10 (thoracis particulate matter) from nineteen air quality monitoring stations. Three types of African dust contributions were identified and characterized (winter, summer and autumn–winter dust outbreaks). Collected samples with and without African dust influence proved that: (a) for the intensive winter African dust outbreaks (daily PM10 levels up to 191 mg/m3) at least 76% of the bulk PM10 levels may be attributable to dust load, whereas the anthropogenic input accounts for only 3–14% and (b) SiO2, Al2O3, Ca, K, Fe, Ti, V, Mn and Ba concentrations are excellent tracers of African origin (Viana et al., 2002).