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Post depositional processes in deep ice cores: a preliminary study on the Talos Dome ice core

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A study on the deepest part of the Talos Dome Ice Core (TALDICE) is presented. The need to better understand the in situ post depositional processes that take place in deep ice has risen due to the possibility to retrieve an ice core that goes back to 1.5 million years before present (Beyond Epica – Oldest Ice Project). Such a project poses significant challenges, one of these is related to the signal preservation in the bottom part of the core. To construct reliable climatic and environmental records it will be necessary to understand the post-depositional processes occurring in deep ice and that affect the original signals present in ice [1-2-3].
Post-depositional processes may involve both the physical and chemical behavior of dust entrapped in ice. We study the effect of increasing depth and rising pressure on the microscopical behavior of dust: when recrystallization of ice occurs, solid impurities are excluded from the ice lattice leading to the formation of dust aggregates. These has been first noticed at depths lower than 2900m in the EPICA Dome C ice cores [1]. We present the dust record of the deepest part of TALDICE, analyzed through Coulter Counter, which shows the presence of dust aggregates, despite a climate related signal, associated to the succession of glacial and interglacial periods, seems to be preserved.
Increasing depth doesn't affect only aggregation, but dust geochemistry also. Indeed, the composition of dust shows some anomalies [4]. In particular, the relative abundance of specific elements (iron, sulfur, calcium and magnesium) is different when comparing shallow and deep dust samples. We present a preliminary chemical analysis on dust grains performed through SEM/EDS, coupled to additional geochemical data.

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