THE SNC METEORITES

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The SNC (Shergotty-Nakhla-Chassigny) group, are achondritic meteorites. Of all SNC meteorites recognized up to date, shergottites are the most abundant group. The petrographic study of Shergotty began several years ago when Tschermak, (1872) identified this rock as an extraterrestrial basalt. Oxygen isotopes in SNC meteorites indicate that these rocks are from a single planetary body (Clayton and Mayeda, 1983). Because the abundance patterns of rare gases trapped in glasses from shock melts (e.g., Pepin, 1985) turned out to be very similar to the Martian atmosphere (as analyzed by the Viking landers, Owen, 1976), the SNC meteorites are believed to originate from Mars (e.g. McSween, 1994). Possibly, they were ejected from the Martian surface either in a giant impact or in several impact events (Meyer 2006). Although there is a broad consensus for nakhlites and chassignites being -1.3Ga old, the age of the shergottites is a matter of ongoing debates. Different lines of evidences indicate that these rocks are young (180Ma and 330-475Ma), or very old (> 4Ga). However, the young age in shergottites could be the result of a resetting of these chronometers by either strong impacts or fluid percolation on these rocks (Bouvier et al., 2005-2009). Thus, it is important to check the presence of secondary processes, such as re-equilibration or pressure-induce metamorphism (El Goresy et al., 2013) that can produce major changes in compositions and obscure the primary information. A useful tool, that is used to reconstruct the condition prevailing during the formation of early phases or the secondary processes to which the rock was exposed, is the study of glass-bearing inclusions hosted by different mineral phases. I will discuss the identification of extreme compositional variations in many of these inclusions (Varela et al. 2007-2013) that constrain the assumption that these objects are the result of closed-system crystallization. The question then arises whether these inclusions can be considered reliable samples of the fluid/melt that was originally trapped.

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MORPHOLOGICAL ANALYSIS OF THE TAIL STRUCTURES OF COMET 1P/HALLEY 1910 II

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Eight hundred and eighty six images from September 1909 to May 1911 are analysed for the purpose of identifying and measuring the morphological structures along the plasma tail of 1P/Halley. These images are from the Atlas of Comet Halley 1910 II. A systematic visual analysis revealed 304 wavy structures along the main tail and 164 along the secondary tails, 41 solitons, 13 Swan-like tails, 26 disconnection events (DEs), 166 knots and six shells. In general, it is possible to associate the occurrence of a DE and/or a Swan-Tail with the occurrence of a knot, but the last one may occur independently. It is also possible to say that the solitons occur in association with the wavy structures, but the reverse is not true. The 26 DEs documented in 26 different images allowed the derivation of two onsets of DEs. Both onsets of DEs were determined after the perihelion passage with an average of the corrected velocities Vc equal to (57 ± 15) km/s. The mean value of the corrected wavelength lc measured in 70 different wavy structures is equal to $(1.7 \pm 0.1) \times 10^6$ km and the mean amplitude A of the wave (measured in the same 70 wavy structures cited above) is equal to $(1.4 \pm 0.1) \times 10^5$ km. The mean value of the corrected cometocentric phase velocity Vpc measured in 20 different wavy structures is equal to (168 ± 28) km/s. The average value of the corrected velocities Vkc of the knots measured in 36 different images is equal to (128 ± 12) km/s. There is a tendency for A and lc to increase with increasing cometocentric distance.

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INTERSTELLAR MEDIUM

DENSITY STRATIFICATION EFFECTS ON THE 3D MODELING OF THE BIPOLAR NEBULA NGC 2346

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The study of planetary nebulae (PNe) is extremely important in order to understand the evolution of low- and intermediate-mass stars. Photoionization codes intent to reproduce the interactions of the central star's radiation with the nebular gas. By using this tool, we are able to determine the physical properties of both: nebula and central star. About 70% of the PNe are ellipticals and bipolars and 20% have round morphologies. The reason why the PNe