International Space Environment Service: Current Activities and Future Plans

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The International Space Environment Service (ISES) is a permanent service of the Federations of Astronomical and Geophysical Data Analysis Services (FAGS) with the mission to encourage and facilitate near-real-time international monitoring and prediction of the space environment. This is done through the work of Regional Warning Centres (RWC) around the world who collaborate in the exploitation of a wide range of space-based and ground-based data. Rapid exchange of information about the space environment is facilitated through the use of standard "URSIgram" codes. RWCs also collaborate in sharing expertise in particular areas of specialty. ISES also prepares the International Geophysical Calendar (IGC) each year giving a list of 'World Days' during which scientists are encouraged to carry out their experiments, and the monthly Spacewarn Bulletins which summarize the status of satellites in earth orbit and in the interplanetary medium. ISES has its origins in the former URSI Central Committee of USRIgrams which initiated rapid international data interchange services in 1928. The modern system of regional warning centres was set up during the International Geophysical Year and now exist in every populated continent except Africa and South America. ISES, as part of its "IGY+50" activities is working to develop RWCs in those continents. ISES is also involved in developing new multi-national space weather services, for example for trans-polar flights. New space-based data on space weather activity will require extensive collaboration if it is to be exploited fully to the benefit of the growing number of users of space weather

services.

in Wiltshire intersected Santonian – Campanian chalks containing 20 m of dark brown phosphatic chalk (defined as having $\geq$5 % P_2O_5, due to the presence of significant amounts of granular phosphate). This unexpected and exciting geological find represents the thickest known phosphate deposit of this age in NW Europe. Subsequent borehole and excavation work provides a unique opportunity to document for the first time the detailed anatomy of a European Upper Cretaceous phosphate deposit, and thereby determine the palaeoenvironmental causes and consequences of its formation.

The preliminary study described here is based on 45 m long Stonehenge core R142. The core displays considerable vertical lithological variability. The top of the Cretaceous section consists of white chalks interspersed with flint and marl seams. The chalks coarsen down-core, and phosphatic chalk-filled burrows become evident. The mid-section of the core consists of friable, dark brown, coarse granular chalk, with concentrated phosphatic grains and white chalk burrow mottling. Below this, the phosphate concentration diminishes, with the reappearance of interspersed marl seams. No basal hardground facies has been identified. Correlation with adjacent boreholes suggests that the phosphatic chalk was deposited within a synsedimentary erosion channel, similar to those described from coeval deposits in northern France. However, considerable lateral variation occurs in the number, extent and phosphate content of phosphatic chalk beds in adjacent boreholes, and the sedimentological relationships are complex.

In order to investigate the sedimentological and environmental conditions that prevailed across the sediment — water interface around the time of deposition, a number of studies have been implemented to determine: water current energy levels; elemental occurrence and distribution; and post-depositional conditions. To achieve this, 23 samples taken at 1 m intervals through the R142 core have been the subject of petrographic thin section, particle-size, and geochemical analysis. ICP - AES and ICP - MS techniques were employed for the determination of major- minor- and trace-elements. SEM - EDX elemental maps have provided evidence for the occurrence and distribution of elements within a phosphate- rich horizon, and sub-samples from the same horizon have been sieved to study the composition of the sand-size fractions. In addition, thin sections have been produced from the sieved sub-samples and these have been subjected to cathodoluminesence to determine the diagenetic condition of the phosphatic chalk. Preliminary results of this work will be presented.

The overall aim of this research is to improve understanding of ‘greenhouse’ systems, and provide a basis for interpreting the environmental causes and consequences during the Cretaceous.