Micropaleontological Ontology: A Link to the Future Earth Science Semantic Technologies

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Over the past couple of decades there has been an effort within E&P companies to better integrate their geological and geophysical specialties. These efforts have typically focused on integrating interpretations after the analyses have been completed in the various specialties. In the coming decades the emerging field of semantic technologies will progressively alter this traditional workflow enabling 'real-time' interaction among specialists and relevant data stores during the analysis process. It is critical that micropaleontology be ready for this future. The semantic technology foundation in the earth sciences is already being constructed under the auspices of organizations such as the Commission for the Management and Application of Geoscience Information. A semantic technology is a methodology or software standard that provides explicit meaning to information (e.g., taxonomies, class models, rules), so that humans and machines can interact at a higher level (i.e., concept or model basis). Micropaleontology's contribution to the application of semantic technologies is in the form of ontologies - formal definitions of domain-specific conceptual models in machine readable format. We have initiated development of an ontology for Foraminifera that includes morphologic, taxonomic, biostratigraphic and environmental information. In order to adequately represent the field of micropaleontology however, participation of experts from all the various micropaleontological sub-disciplines are needed. Without such a unified effort the development of the next-generation applications that rely on these ontologies will be severely hindered, as will the use of micropaleontology in E&P and more fundamentally, micropaleontological research. To accomplish this goal will require a multi-institutional, academic/industry effort to develop open-source micropaleontology-specific ontologies.