

**SEMINARIS DE LA FACULTAT DE CIÈNCIES DE LA TERRA
I L'INSTITUT DE CIÈNCIES DE LA TERRA 'JAUME ALMERA'**
Universitat de Barcelona (UB) i Consell Superior d'Investigacions Científiques (CSIC)

CONFERÈNCIA:
The Kimberlite 'Puzzle'

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Dia: Dilluns 7 de novembre
Hora: 12:00 h

Lloc: Sala d'actes de l'Institut Jaume Almera

Kimberlites are uncommon volcanic rocks of volatile-rich ultramafic composition that only occur in continental areas. Despite their limited abundance, kimberlites have attracted considerable interest being the major host of diamonds and because kimberlites represent the deepest terrestrial melts preserved at surface. Kimberlites could therefore be exceptional probes of the deep Earth evolution. On the other hand, kimberlites are a real enigma in the Earth sciences. The highly reactive nature of kimberlite melts, the hybrid nature of kimberlite rocks, which include magmatic and abundant xenocrystic components, and their susceptibility to post-emplacement modification contribute to obscure the pristine features of kimberlite magmas. As a result, there is still significant controversy on most aspects of kimberlite geology and genesis despite nearly 50 years of dedicated studies. For instance, estimates of parental melt composition range from anhydrous, alkali-rich carbonate-chloride melts to hydrous, alkali-poor ultramafic compositions.

In this seminar I will present an overview of the major features of kimberlite rocks and critically review the main issues concerning kimberlite research. These can be schematised as a 'kimberlite puzzle' whereby each piece of the puzzle cannot be resolved in isolation to obtain a valid conclusion. I will provide a range of petrographic and geochemical results for kimberlites from Kimberley (South Africa), which is the kimberlite type-locality, and discuss different aspects of kimberlite formation and evolution within the framework provided by the "kimberlite puzzle".