

# Coeval volcanism and evaporite sedimentation in the Fortuna basin (Neogene, Murcia, Spain): Petrographic evidence of synchronism

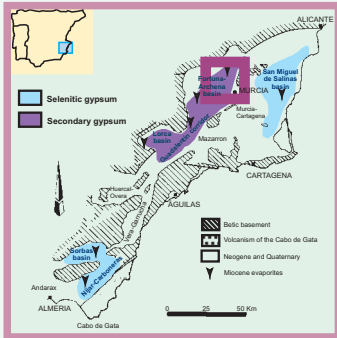
THE MESSINIAN SALINITY CRISIS REVISITED  
Corle, July 20-24, 2004



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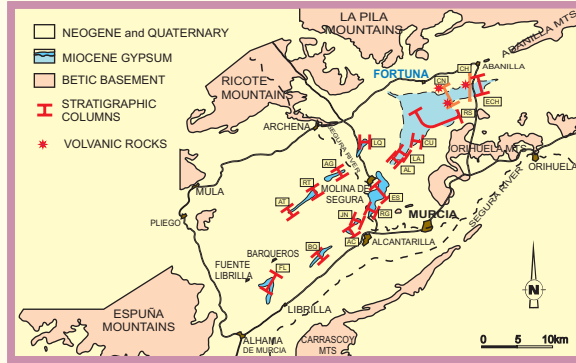
Spanish DGI BTE 2001-3201 Project

## 1 Geological setting



The Neogene basins of the Eastern Betic Mountains were located in a marginal position with respect to the deep Mediterranean basin during the Tortonian and to the Messinian.

## 2 Evaporites of the Fortuna-Guadalentín corridor basins

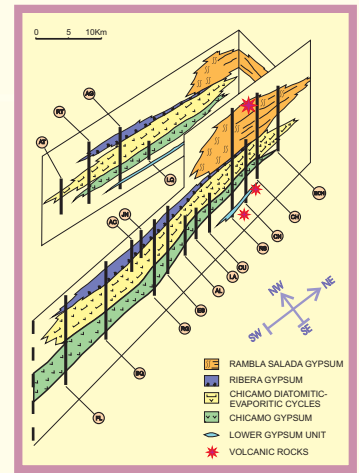


FL: Fuente Librilla. BQ: Barqueros. AC: Alcantarilla. JN: Jabali Nuevo. RG: Molina-Alcantarilla road. ES: Molina-Murcia road. AL: La Alcaina. LA: La Alcaina-II. CU: La Casa del Cura. RS: Rambla Salada. CN: Cabezos Negros. CH: Río Chicamo. ECH: Abanilla. LQ: Lorquí. AG: Loma de las Veneras. RT: Rodeo de los Tenderos. AT: Alcantarilla-Albudulete road.

Evaporites mainly consist of laminated and nodular secondary gypsum.

Primary gypsum also occurs (selenitic, burrowed microlenticular and gysarenite).

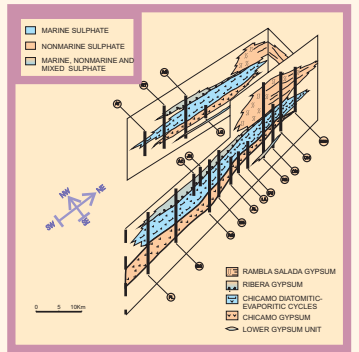
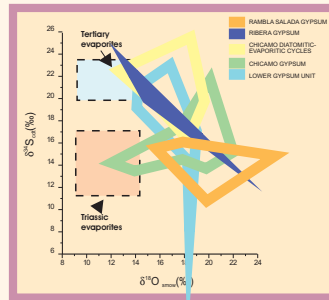
Five stratigraphic units:  
Lower Gypsum  
Chicamo Gypsum  
Diatomitic-Evaporitic Chicamo Cycles  
Ribera Gypsum  
Rambla Salada Gypsum



## 3 Isotope Geochemistry of the evaporites

The sulphur-oxygen (and strontium isotope compositions) indicate precipitation from Tertiary marine brines or from meteoric waters (recycled Triassic sulphate anion and additional non-marine contributions from country rocks and hydrothermal solutions).

Intermediate values are attributed to mixed seawater and non-marine mother brines.



## 4 Sedimentological interest of volcanic rocks?

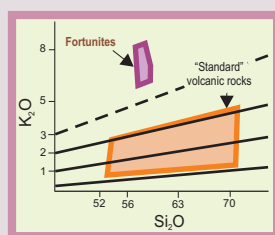
Volcanic and shallow intrusive rocks are datable  
→ stratigraphic markers

**LAVA PYROCLASTIC FLOWS SILLS** (younger than host rock strata)

### PEPERITES

- Produced by liquid immiscibility between two liquids of contrasted viscosity
- Hot magma and fluidified (unconsolidated, water saturated) sediment contact
- Coeval (or near to) the host rock

## 5 The volcanic rocks: the Fortunites



Lamproites are rare volcanic rocks, but widespread in SE Spain upper Miocene times.

Volcanic rocks Fortuna basin:

- Silice Subsaturated
- High K, Mg contents
- Presence of **macroglobular and microglobular peperites**
- Presence of **haline rims** (chilled margins, pillow lava-like)

Evidence of water saturated unconsolidated host rock

## 6 Evidences of synchronism in the Fortuna basin?: the PEPPERITES

### Los Cabezos Negros outcrop



Individual domic volcano with lava flow expansions and dikes, 400 m in diameter.

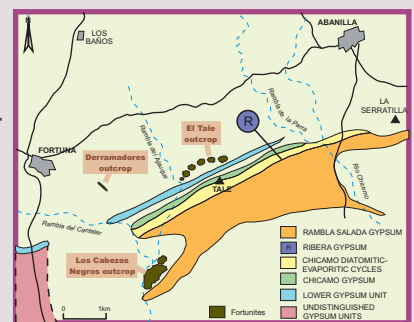


### Derramaedores outcrop



Intrusive subvertical dike. Microglobular peperites.

### Fortunites outcrops



### El Tale outcrop



Outcrops forming an arc, 600 m long. Intrusive subvertical dike. Microglobular peperites.

## 7 Conclusions

Presence of peperitic lithofacies in the volcanic rocks (Cabezos Negros, El Tale and Derramaedores outcrops) of the Fortuna basin (Eastern Betics).

The peperites are coeval (or near) to the evaporite sediments.

Dating of the volcanic rocks will allow to date the evaporite units.

A new step to enlighten the controversy around its Tortonian or Messinian age?