

Modeling Precipitation Patterns in Hyperarid Soils

Atacama Desert, Chile

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Atacama Desert



- * Among driest places on Earth
- * Hyperarid climate since Pliocene
- * Large surficial deposits of salts



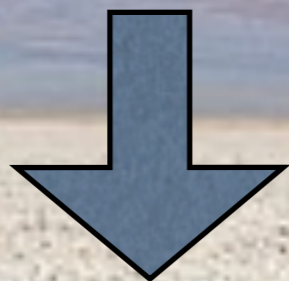
**What precipitation pattern
can explain observed
deposition depth trend?**

SO₄ (gypsum) layers on top

NaCl (halite) below

Annual Salt Deposition

NaCl



CaSO₄



Precipitation event



NaCl

CaSO4



Dissolution of salts

H₂O

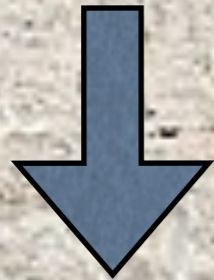
+

NaCl

CaSO₄

Downward movement of salt saturated water

H₂O + NaCl



H₂O + CaSO₄



Deposition of salt as soil dries out



H₂O

NaCl



H₂O

CaSO₄

RESULTS

**Frequent 'small'
events**

=

**CaSO₄
NaCl**

**Infrequent 'moderate'
events**

=

CaSO₄

NaCl

Conclusion

The Atacama Desert has experienced a period of hyperaridity punctuated with brief infrequent episodes of rainfall that are larger than the long term average