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PREVIOUSLY PROPOSED CARBONATE CAPROCK NOMENCLATURE

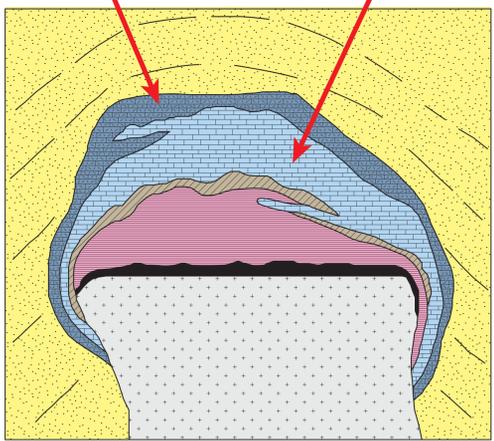
TEXAS GULF COAST CALCITE CAPROCKS:

UPPER VARIEGATED

LOWER BANDED

Upper variegated commonly contains clastic detritus and variegated clasts of carbonate in a carbonate matrix. These carbonate clasts and matrix contain irregular segregations of a later, more coarsely crystalline calcite. All gulf coast diapirs containing carbonate caprocks contain this fabric.

Lower banded or "zebra textured" zone. Numerous calcite stages form horizontal bands that are commonly cross-cut by late-stage calcite veins. Roughly half of gulf coast diapirs containing carbonate caprocks contain this fabric.



Cross sectional view of a typical caprock bearing salt diapir showing generalized caprock lithologic zonation. Not to scale. Modified from Kyle and Posey, 1991.

EXPLANATION

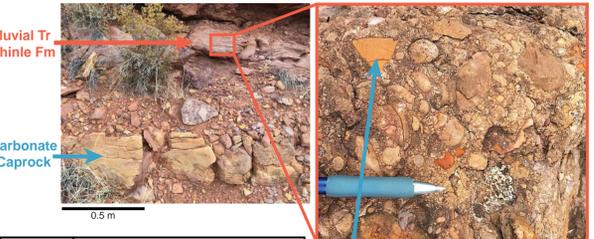
- Cenozoic sediments
- Variegated calcite caprock
- Banded calcite caprock
- Gypsum caprock
- Anhydrite caprock
- Salt dissolution zone
- Salt stock

CAPROCK CLASSIFICATION BASED ON FABRIC

DESCRIPTION	SCHEMATIC DIAGRAM	FABRIC EXAMPLES	MASSIVE	PORPHYRITIC	LAYERED			BRECCIATED				
					MICROLAMINATED	LAMINATED	BANDED	CRACKLE	MOSAIC	DISORGANIZED		
Massive fabrics consist of a homogeneous mineralogy and crystal size, and lack any internal structure.					Microlaminated fabrics consist of 1-3 mm thick laminae.	Laminated fabrics consist of 3-10 mm thick laminae.	Banded fabrics consist of laminae greater than 10 mm thick.	Crackle breccias contain clasts that display little relative displacement.	Mosaic breccias consist of clasts that are loosely fitted together. Most clast boundaries are typically oriented parallel to each other.	Disorganized breccias consist of spatially independent clasts. Clast boundaries are rarely parallel to one another.		
					GYPSUM ROSETTES 	MICROBIAL 	UNDULATED 	FOLDED 	FOLDED 	ORTHOGONAL FRACTURES 	MONOMICT 	
					SILICIFIED ROSETTES 	ENTEROLITHIC 	SEGMENTED 	SIGMOIDAL 	BOXWORK FRACTURES 	COARSE VEINS 	POLYMICT 	

CAPROCK CLASTS IN OVERLYING STRATA

Gypsum Valley, Paradox Basin, CO



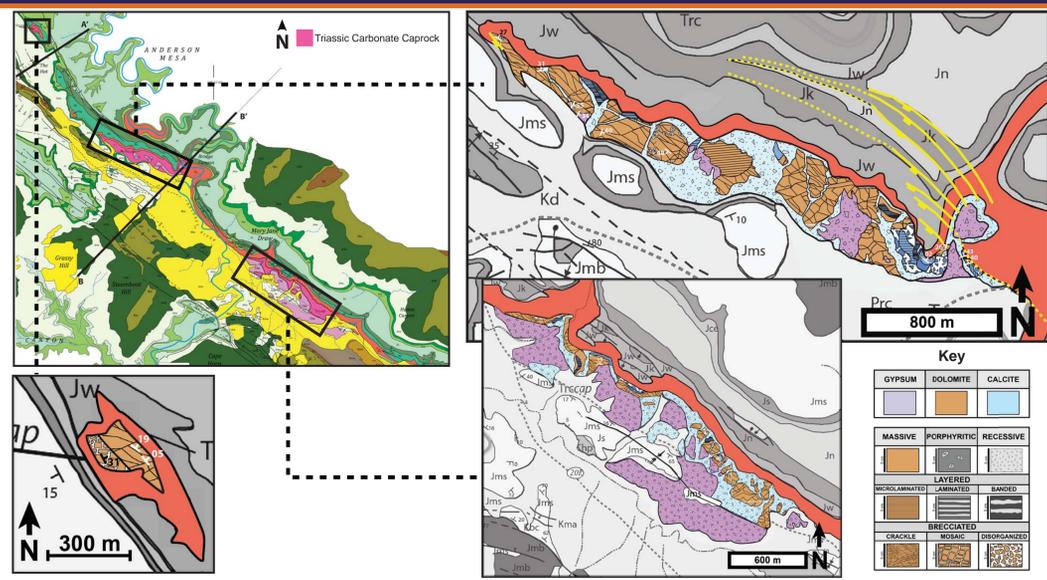
Carbonate Caprock Clasts

- Fabric type of caprock clasts within the overlying Chinle Formation are all microcrystalline massive dolomite
- This suggests that massive microcrystalline dolomitic capstone was the original fabric type at the Gypsum Valley salt wall.

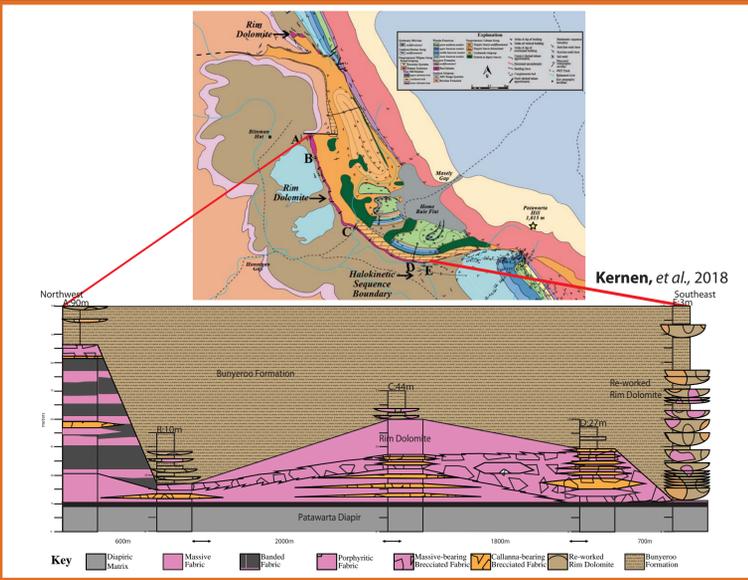
Modified from Mast, 2016

PROOF OF CONCEPT

GYPSUM VALLEY SALT WALL, PARADOX BASIN, CO



PATAWARTA DIAPIR, FLINDERS RANGES, SA



CONCLUSIONS

The development of a caprock classification scheme has allowed for the communication between researchers in regard to caprocks found at the salt-sediment interface around the world. Therefore, it has provided a means for comparison of the similarities and differences of caprock at multiple localities.

SIMILARITIES

DIFFERENCES

- Evidence at all localities suggests that the massive fabric is the first to develop, and that the remaining fabrics have been diagenetically superimposed.
- At Patawarta, clasts from the Callanna (i.e. quartzites, metaigneous) stratigraphy are incorporated into the caprock. We have not observed precursor lithologies incorporated in the Paradox Basin caprock.
- All of the proposed fabrics are found at both localities – with variations.
- Both gypsum and carbonate caprock are present at the Gypsum Valley (GV) salt wall. The caprock at Patawarta is entirely carbonate.
- The GV caprocks contain dolomite and calcite caprock, whereas at Patawarta, the primary mineralogy is dolomite with only minor calcite present as late-stage vein fills.
- The porphyritic, layered and brecciated fabric types exhibit a patchy distribution and are rarely correlative.

EVAPORITE NOMENCLATURE

NODULAR ANHYDRITE			GYPSUM		
CHICKEN WIRE	ENTROLITHIC	AGGREGATE	ELONGATE	LENTICULAR	ROSETTES

IMPORTANCE OF CAPROCK

- Petroleum system timing - when and how do these caprocks form? Timing of hydrocarbon migration
- Misidentified stratigraphy - implications on well top pics and overall cross-section structure
- Drilling hazard - misidentified lithology with unknown fluids and pressures
- Additional reservoir - high porosity and permeability depending on fabric type

REFERENCES

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