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Closed Depressions

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7. Uvala
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Subsidence

Dolines originate from four primary mechanisms:

- Dissolution
- Collapse
- Suffosion
- Subsidence

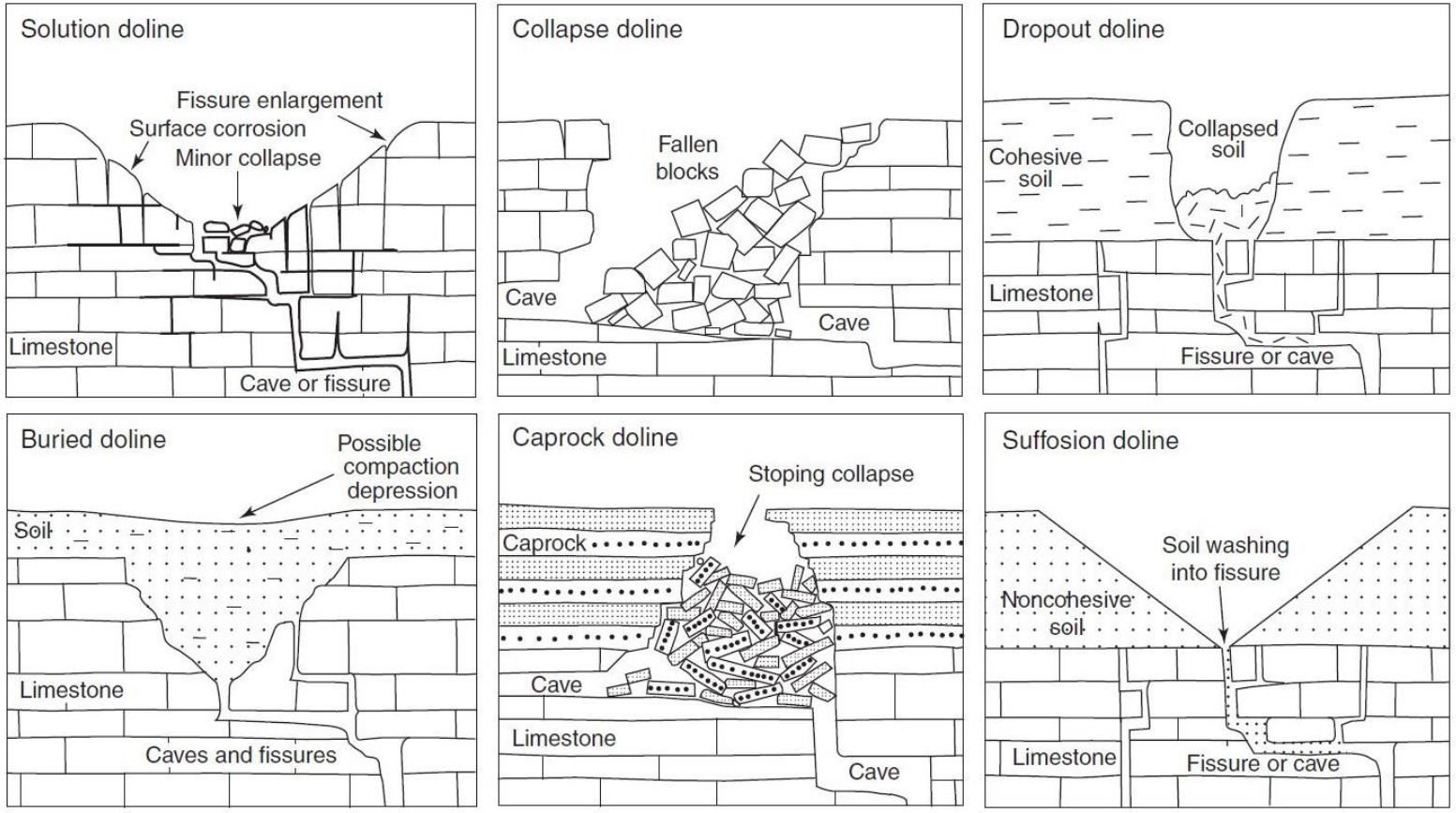


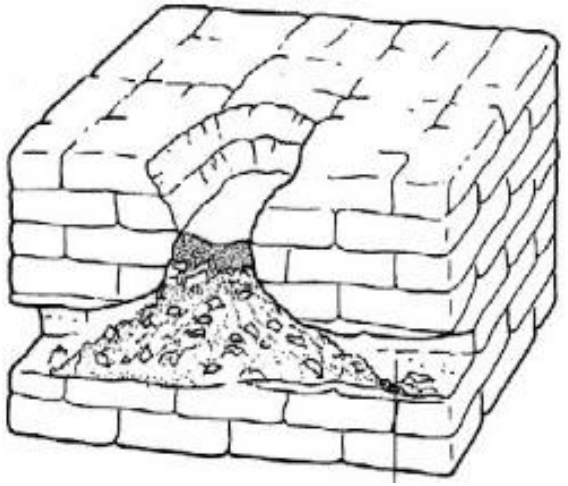
Figure 2 Six main types of dolines. Reproduced from Waltham, A.C., Fookes, P.G., 2003. Engineering classification of karst ground conditions. Quarterly Journal of Engineering Geology and Hydrogeology 36, 101–118.

Waltham, A.C., Fookes, P.G., 2003. Engineering classification of karst ground conditions. Quarterly Journal of Engineering Geology and Hydrogeology 36, 101–118.

Closed Depressions

2. Collapse Doline / Çökme Dolini / Obruk

The primary formation mechanism of a collapse doline is collapse, characterized by the sudden downward movement of the ground. Solution plays an indirect role in cave enlargement beneath the surface, causing surface lowering and enlarging fissures until the ceiling weakens and collapses, resulting in the formation of a collapse doline. Typically, a collapse doline exhibits a subcircular plan, ranging from a few tens to a few hundred meters in diameter, with slopes that are very steep to vertical or subvertical. If its width exceeds its depth, it is termed a karst shaft. Over time, the sides of a collapse doline degrade primarily through weathering, resulting in gradually shallower slopes as debris accumulates at the bottom, leading to flattening. Eventually, a collapse doline may lose its characteristic form and resemble a large, bowl-shaped solution doline.

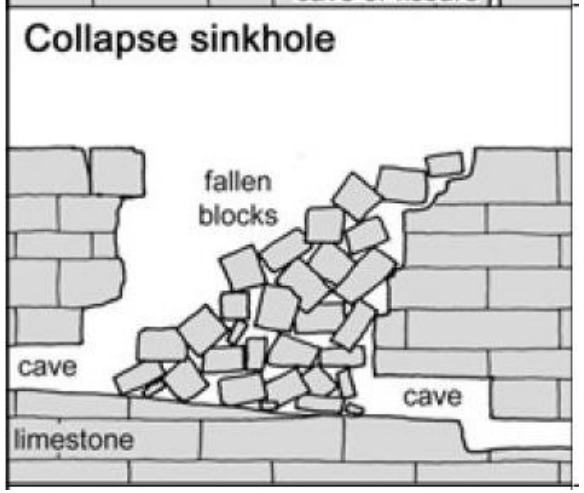


https://www.motorradphilosophen.de/geographie/phygeo/karst.html

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

If the base of a collapse doline reaches the karst groundwater table / water table the bottom of such dolines may become be periodically or permanently flooded. Because of their large size and distinctive appearance, collapse dolines stand out as prominent surface features and are easily recognizable in the field. Consequently, they are often referred to by unique local names.

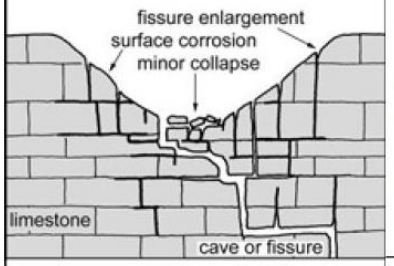
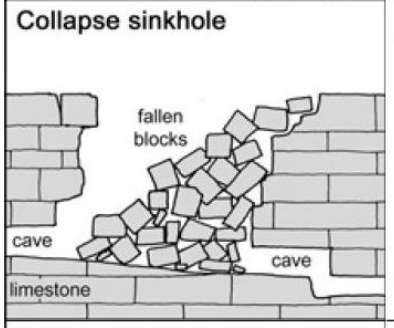
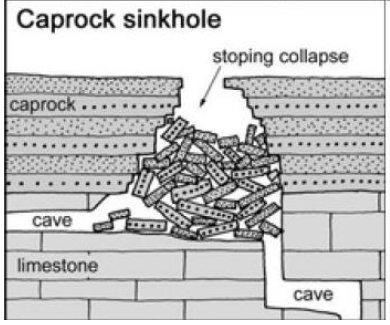


Waltham, T., Bell, F. and Culshaw, M. 2005. Sinkholes and Subsidence. Springer

A closed depression that is deeper than it is wide is classified as a speleological feature. These forms called cenote which are deepere than its wide

Closed Depressions

Major Parameters for Doline Types

Solution sinkhole 	*Formation process*	Dissolutional lowering of surface
	Host rock types	Limestone, dolomite, gypsum, salt
	Formation speed	Stable landforms evolving over >20,000 years
	Typical max size	Up to 1,000 m across and 100 m deep
	Engineering hazard	Fissure and cave drains must exist beneath floor
	Other names in use	Dissolution s/h, cockpit, doline
Collapse sinkhole 	*Formation process*	Rock roof failure into underlying cave
	Host rock types	Limestone, dolomite, gypsum, basalt
	Formation speed	Extremely rare, rapid failure events, into old cave
	Typical max size	Up to 300 m across and 100 m deep
	Engineering hazard	Unstable breakdown floor; failure of loaded cave roof
	Other names in use	Cave collapse s/h, cenote
Caprock sinkhole 	*Formation process*	Failure of insoluble rock into cave in soluble rock below
	Host rock types	Any rock overlying limestone, dolomite, gypsum
	Formation speed	Rare failure events, evolve over >10,000 years
	Typical max size	Up to 300 m across and 100 m deep
	Engineering hazard	Unastable breakdown floor
	Other names in use	Subjacent collapse s/h, interstratal karst

Waltham, T., Bell, F. and Culshaw, M. 2005. Sinkholes and Subsidence. Springer

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Kanlıdivane

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Döşemealtı

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

İbradı

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Ambar Obruk

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Karapınar

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Karapınar

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Karapınar Meyil Obruk

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Karapınar Çıralı Obruk

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Kızören Obruğu

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Karapınar

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Karapınar

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Karapınar

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Karapınar

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Kadınhanı

Closed Depressions

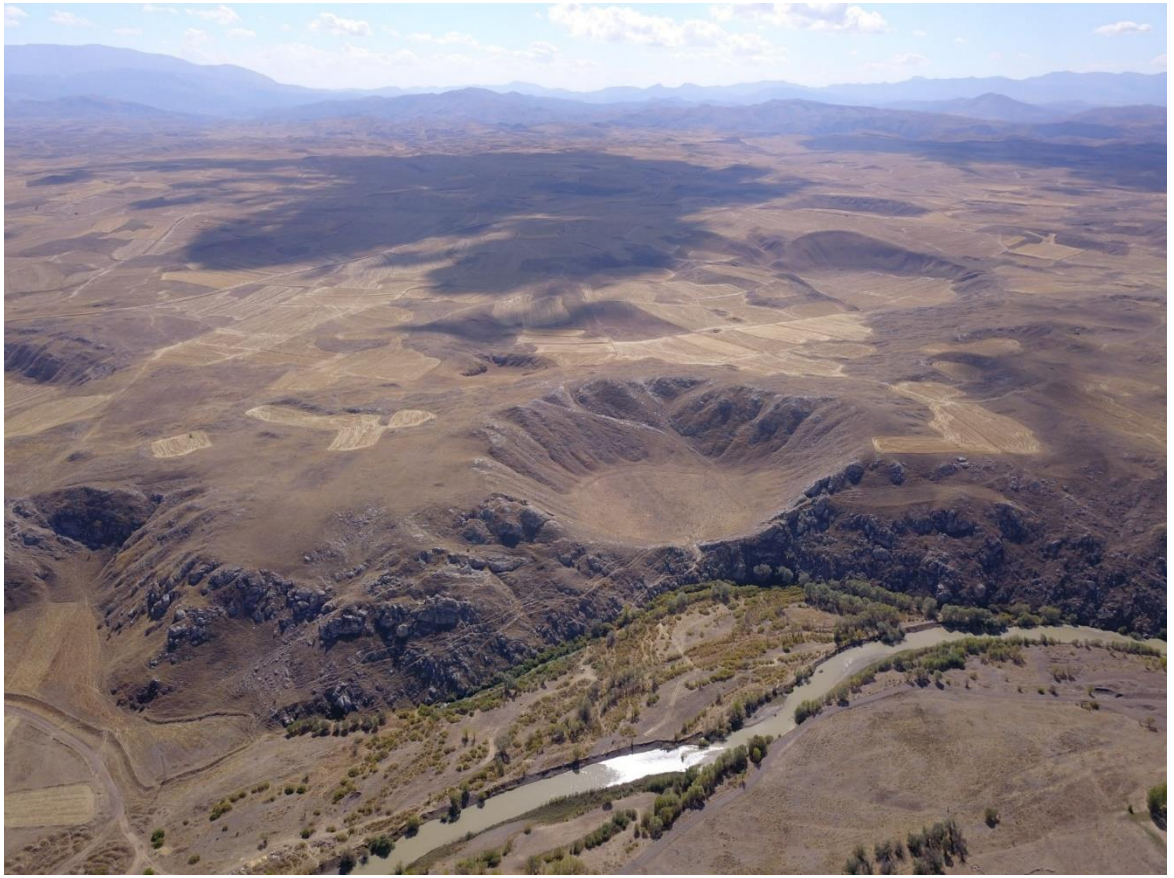
Collapse Doline / Çökme Dolini / Obruk

Sivas Zara Kızılırmak Ekinli Obruğu

Closed Depressions

Collapse Doline / Çökme Dolini / Obruk

Sivas Zara Kızılırmak Ekinli Obruğu



Closed Depressions

Collapse Doline / Çökme Dolini / Obruk