



# A Stratigraphic Analysis of The Slieve Bloom Mountains in Offaly/Laois Counties, Ireland

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## Abstract

This is a study of the Slieve Bloom Mountains of Ireland, situated between Offaly and Laois County. The Slieve Bloom is the oldest mountain range in Europe, which once reached a peak elevation of 3,700m but stands at an elevation of 527m today. The mountains, formed during the Cordilleran Orogeny, provide profound evidence of depositional history through excellent preservation of several rock types. Most notably, the mountain range contains a notorious unconformity between Silurian age rocks and the Devonian age Old Red Sandstone, a time gap of roughly 70 million years. The Silurian rocks constitute a single formation (the Capard Formation), outcropping in 16 inliers of the area. The Old Red Sandstone overlies the Capard Formation, making up the unconformity.

## Introduction

This study was conducted with the purpose of explaining the stratigraphy that makes up the Slieve Bloom mountains of south-central Ireland as well as the unconformity between the Silurian rocks and the rocks of the Devonian period. The lithology of the sediments in the area provide important clues to the history of the landscape as well as the depositional environments that deposited them. Previous studies of the region found that the Capard Formation (Silurian rocks) is made up of fine-grained slates, banded siltstones, laminae mudstones and greywacke sandstones. As for the Old Red Sandstone Formation (Devonian rocks), outcrops show the presence of conglomerates, mudstones, and characteristically red sandstones. It is important to note that the formation of the Slieve Bloom was a process that took place over the course of more than 70 million years and occurred due to varying depositional environments and climates. The exceptional unconformity in the region can be described as a time gap between the Silurian and Devonian age sediments which occurred due to the erosion of original deposition. Rock types of both Formations represented by stratigraphic column.

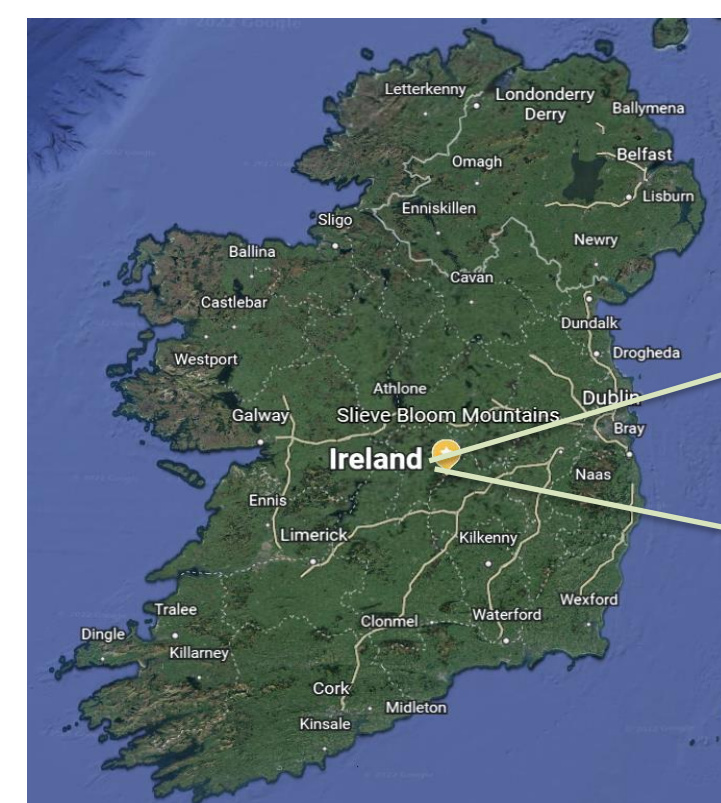


Figure 1: Image of Ireland, (Google Earth)

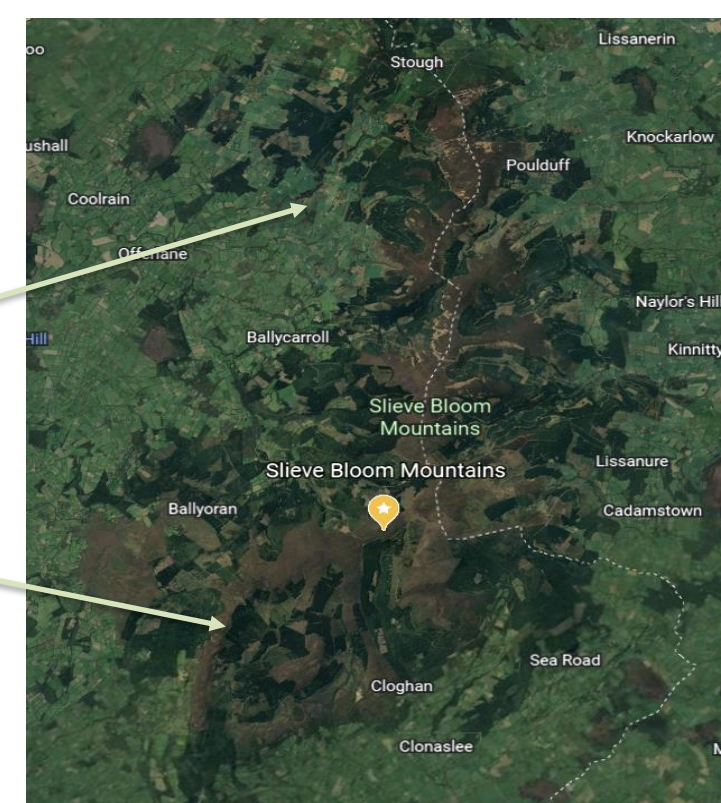


Figure 2: Image of Slieve Bloom, (Google Earth)

## Methodology

Research for the stratigraphic analysis of the Slieve Bloom mountains was conducted by literature reviews of several scientific articles pertaining to the area. Other methods for research will include field validation and verification of stratigraphic and geologic data collected from the literature review process. This will occur in May when my class and I visit Ireland, where we will examine the Slieve Bloom Mountains. There I will be considered the “expert in the field” and will conduct further research over the landscape and explain the significance of the mountains to my classmates.

## Results

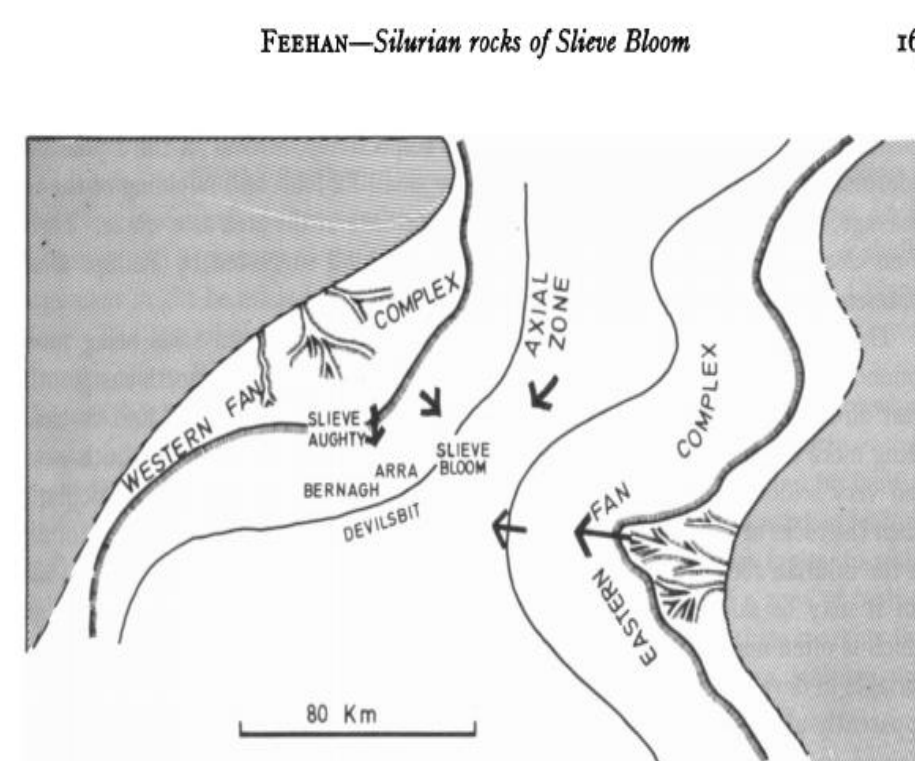
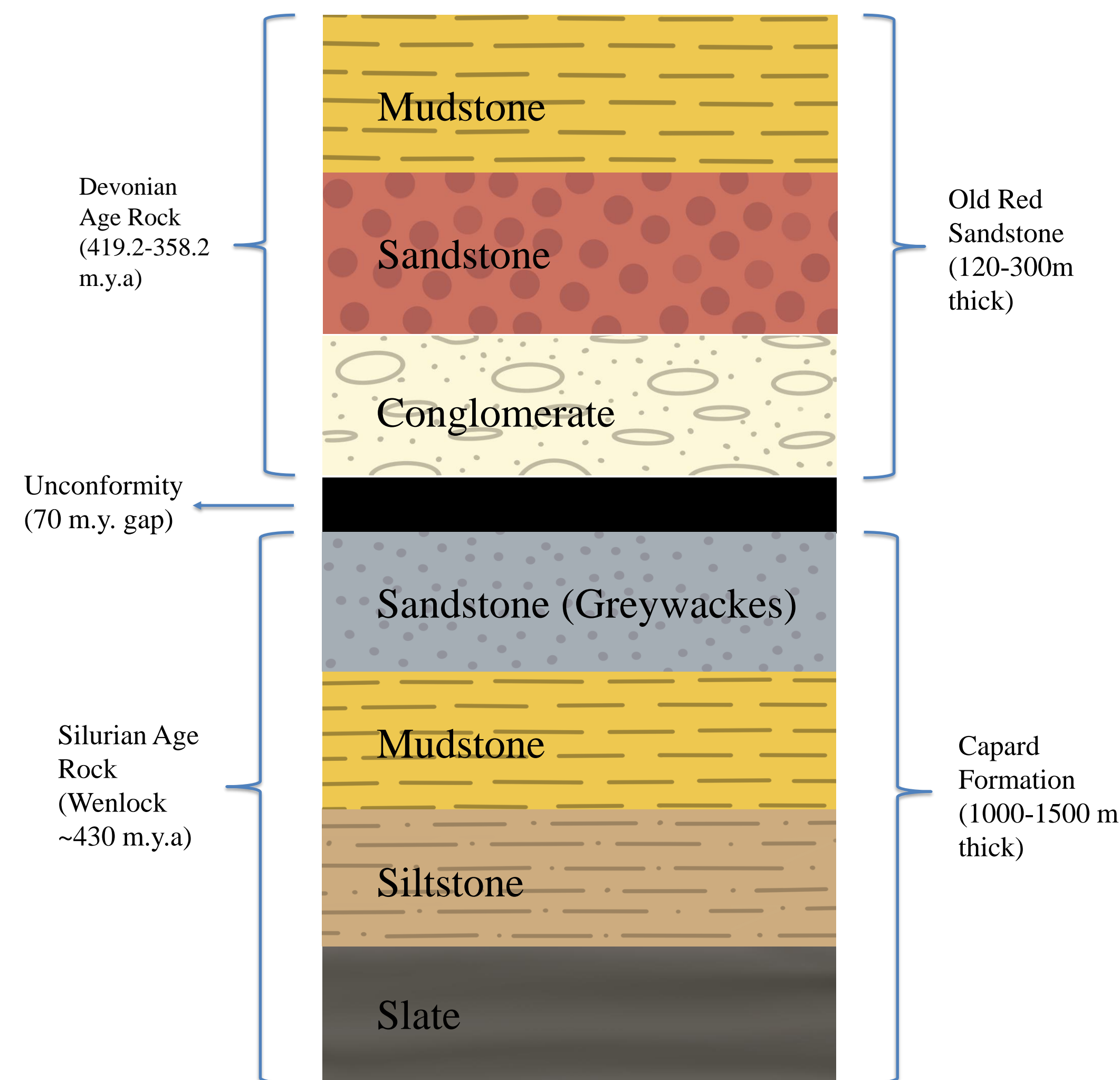


Figure 3: Simplified reconstruction of the paleogeography of Irish midlands, (Feehan)

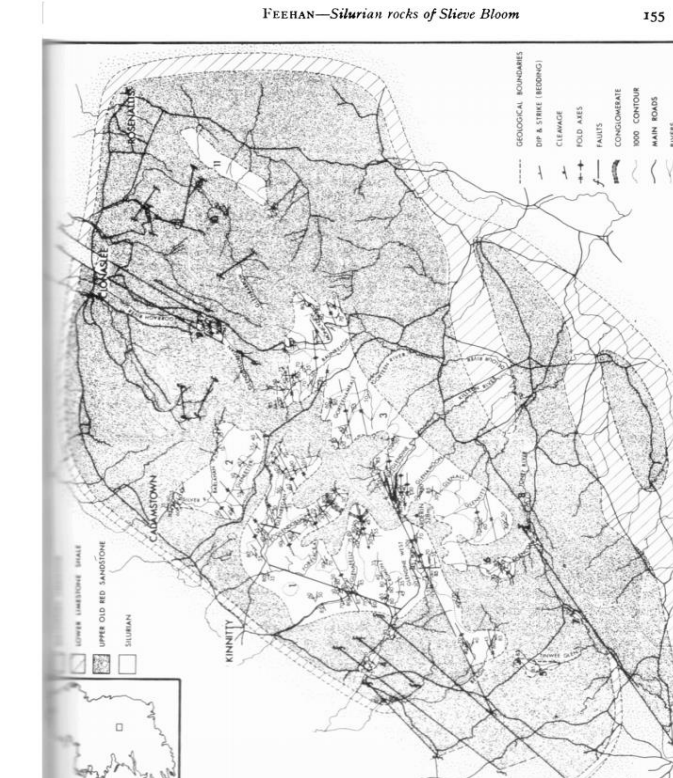


Figure 4: Geologic map of Laois/Offaly Counties, (Feehan)

## Discussion and Conclusions

- Deep ocean turbidity currents as a result of a submarine canyon systems, creating turbidite successions, deposited Silurian sediment when the midlands were submerged under a deep ocean
- Closure of Iapetus Ocean due to welding together of Laurentia and East Avalonia provided Ireland's foundation
- The result of this was the Cordilleran Orogeny, causing uplift of the deposited rock
- This mountain building event created subtle metamorphic mechanics to take place, resulting in the slate foundation
- Silurian Rocks display ideal fining up sequence known as a Bouma Sequence and contain rock types of siltstone, mudstone, and greywacke sandstone.
- Mountainous terrane and lack of vegetation at the time created an arid environment that accelerated erosion of Silurian rocks
- Old Red Sandstone is the general term for rock sequences originating as eroded sediment in rivers and lakes at the foot of the mountains
- Deposition of Old Red Sandstone attributed predominantly to alluvial fan systems as well as meandering rivers at the base of the mountain range
- Old Red Sandstone Formation contains rock types of conglomerate, sandstone, and mudstone
- Erosion of deposited sediment provides exposure of 16 inliers that give access to the older, underlying Capard Formation
- This erosion is responsible for the 70 million year old unconformity between the Capard Formation and Old Red Sandstone, which is best seen at Devilsbit Mountain

Silurian Period					
Eonothem/ Era	System/ Period	Series/ Epoch	Stage/ Age	millions of years ago	
Phanerozoic	Paleozoic	Silurian	Pridoli	419.2 ± 3.2	
			Ludlow	423.0 ± 2.3	
			Goniatite	425.6 ± 0.9	
			Wenlock	427.4 ± 0.5	
			Homerian	430.5 ± 0.7	
			Sheinwoodian	433.4 ± 0.8	
			Telychian	438.5 ± 1.1	
			Aeronian	440.8 ± 1.2	
			Rhuddanian	443.0 ± 1.5	

Figure 5: Silurian Age Chart, (International Commission on Stratigraphy)

Devonian Period					
Eonothem/ Era	System/ Period	Series/ Epoch	Stage/ Age	millions of years ago	
Phanerozoic	Paleozoic	Devonian	Upper	Famennian	358.9 ± 0.4
				Frasnian	372.2 ± 1.6
			Middle	Givetian	382.7 ± 1.6
				Eifelian	387.7 ± 0.8
			Lower	Emsian	393.3 ± 1.2
				Pragian	407.6 ± 2.6
				Lochkovian	410.8 ± 2.8
				Lochkovian	419.2 ± 3.2

Figure 6: Devonian Age Chart, (International Commission on Stratigraphy)

## References

- Feehan, J. (1982). The Silurian Rocks of the Slieve Bloom Mountains, Counties Laois and Offaly. *Proceedings of the Royal Irish Academy. Section B: Biological, Geological, and Chemical Science*, 82B, 153–167. <http://www.jstor.org/stable/20494391>
- Doran, R. J. P., Holland, C. H., & Jackson, A. A. (1973). The Sub- Old Red Sandstone Surface in Southern Ireland. *Proceedings of the Royal Irish Academy. Section B: Biological, Geological, and Chemical Science*, 73, 109–128. <http://www.jstor.org/stable/20518913>
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\* Due to limited exposure, proportion of successions are represented equally with a general range of formation thickness