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Why isn't the lithostratigraphy for magmatic and metamorphic rocks valid?

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Definition of lithostratigraphy according to the International Stratigraphic Guide is “the element of stratigraphy that deals with the lithology of strata and with their organization into units based on lithologic character” (Hedberg 1976). There is a minor change in the 2nd edition made by A. Salvador (1994) “Lithostratigraphy. The element of stratigraphy that deals with the description and systematic organization of the rocks of the Earth’s crust into distinctive named units based on the lithologic character of the rocks and their stratigraphic relations”.

There are also minor differences in the definition of the lithostratigraphic units between the 1st and the 2nd editions “Lithostratigraphic unit – a body of rock strata that is unified by consisting dominantly of certain lithologic type or combination of lithologic types, or by possessing other impressive and unifying lithologic features. A lithostratigraphic unit may consist of sedimentary, or igneous, or metamorphic rocks, or of an association of two or more of these. Lithostratigraphic units are recognised and defined not by inferred geologic history or mode of genesis.” “The critical requirement of the unit is a substantial degree of overall lithologic homogeneity.” The homogeneity in broader sense may mean a great variety of different rock types, characteristic for the entire formation. In the Salvador’s edition (1994): “Lithostratigraphic Unit. A body of rocks that is defined and recognized on the bases of its observable and distinctive lithologic properties or combination of lithologic properties and its stratigraphic relations.” Salvador’s explanation of the “lithologic homogeneity”: “Diversity in detail may in itself constitute a form of overall lithologic unity.” There are a few important statements in the 2nd (Salvador’s) edition of the Guide. “Definition and recognition of lithostratigraphic units must be based on description of the lithologic composition” and not on geophysical properties. Fossils may also be important in the recognition of a lithostratigraphic unit either because of their distinctive constituents or because of their rock forming properties. There is another important statement about the laterally discontinuous rock bodies with the same lithologic properties and approximately the same stratigraphic position: They can also be a single lithostratigraphic unit. This is the case with the “series of genetically related but discontinuous igneous bodies or series of disconnected reef limestones or coal lenses lying at approximately the same stratigraphic position”.

According to the North American Stratigraphic Code a *lithostratigraphic unit* is a geologic rock unit that conforms to the principles of superposition, while the lithodemic unit generally does not conform to the Law of Superposition. This definition is fundamentally different from that of the International Stratigraphic Guide (ISG – see above). According to the latter these kinds of units are based on the lithologic composition independently from their super- or subposition. If we look at the relation of the basic lithostratigraphic units (formations) of the sedimentary successions in the Alpine–Carpathian–Dinaridic system we have to recognize that many famous units are overlain or underlain by different lithostratigraphic units from place to place and also they are interfingering with different units of varied lithology. The Seefeld Fm. is situated within the Hauptdolomit Fm. in the Eastern and Southern Alps. It is not an exceptional situation in sedimentary successions.

What is the conclusion? Nevertheless the Law of Superposition usually can be recognized in the sedimentary successions but not obligatorily. Therefore it can't be considered as a definitive element of the lithostratigraphic classification. As the Formation is the primary unit of the lithostratigraphic classification to draw the boundary between the formations it is very important not only from the Law of Superposition but also from the lateral contact point of view. To draw a boundary between the varied types of sedimentary rocks is often more difficult than between sedimentary and magmatic rocks. The age determination of the different types of rocks is not more complicated if both of them have lithostratigraphic names. In columnar sections they are next to each other as similar rank units. Anyway it is high time to establish a working group to discuss the still open questions among experts of sedimentary, magmatic and metamorphic rocks.