

Preserving and Improving Global Stratigraphic Principles and Procedures

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The increasing use of seismic reflection profiling in commercial exploration and academic research in the last two decades or so has prompted dissemination of the concepts of a depositional sequence and of an unconformity-bounded unit. The impact has been relevant at the operational, technical and interpretative levels. However, no great advances have been made on fundamental stratigraphic principles, the main consequences having been the replacement of some old terms and the introduction of new ones describing known stratigraphical processes and objects (well expressed in seismic stratigraphy).

A depositional sequence (DS) became a popular informal term soon after re-introduction, but was not considered to be suitable for formal codification (and hence cartographic use) because of the implicit and recognized subjectivity in the field use. For this reason, depositional sequences were not included in the list of formal stratigraphic units in the 2nd edition of the International Stratigraphic Guide (ISG) of 1994.

Unconformity-bounded units (UBU) instead represented one of the major new entries of the ISG of 1994 (although having been introduced earlier), and were conceived as an important tool of formal stratigraphic (and hence cartographic) subdivision especially in geological fields such as volcanic to volcanoclastic settings and continental Quaternary deposits that are rich in unconformities. Despite some uncertainties and discussions derived from the unfortunate byzantinistic introduction of the later synonymous allostratigraphic units in the North American Stratigraphic Code (1983), the UBU have been adopted in many National Stratigraphic Codes even before the ISG 1994 was published. In fact, many geological maps with UBU in their legend have already appeared and are expected to increase in number in the near future.

Under such circumstances, it was surprising to read in the ICS reports to the 31st IGC in Rio de Janeiro 2000 that parties and working groups, even within the ICS-ISSC, have been and are still discussing changes to the ISG. Such discussions are based on the assumptions that: 1) UBU would not have attained a consensus for their use, and 2) no difference would exist between the concepts of UBU and DS. Both assumptions are wrong: 1) A careful review of the literature shows that the concept of UBU is commonly adopted and used, and 2) It is common experience of people that have tried to implement both the UBU and DS as cartographic tools in geological mapping that they require a very different degree of subjectivity in placing the limits of the related rock units.

In any case, even if the two above assumptions were true, the current attempts to modify the present ISG of 1994 are not justified. Changing a rule in a conventional matter such as stratigraphic codification differs greatly from setting additional rules. Before changing an existing rule or a standard a convenient time for testing its use should be allowed, and, from past experience in stratigraphy, this should be in the order of half a century. Changes in the ISG should be considered extremely carefully in advance; once they have been agreed upon and introduced, they should not be changed for several decades, and only after new and important facts have occurred. The recently settled question about the lowering of the Quaternary Global Stratotype Section and Point (GSSP) raised at the beginning of the 1990s should have taught something to individual stratigraphers as well as to the ICS as a whole.

The Italian National Committee on Stratigraphy (INCS) is very concerned about the move to change stratigraphic rules that have been recently adopted and are being implemented in ongoing long term cartographic projects. Such a change could be very dangerous leading to destabilization of the common use of the global unique language provided to the Earth Sciences by stratigraphy, and to lowering its social impact potential.

The INCS asks the ICS:

- 1) To make more use of the National Committees (both related to ICS and/or IUGS) as sources of accurate information and expression of opinions, in addition to its institutional subcommissions and working groups.
- 2) To concentrate first on institutional duties (such as completion of GSSP definition, dissemination of stratigraphic principles and procedures as consolidated in the ISG of 1994, control of the correct compliance of the ISG in the geological literature and attempt to harmonize the National Codes to the ISG and not *vice versa*).
- 3) To be open to new stratigraphic suggestions, keeping clearly separated the stage of consideration and discussion from the stage of possible inclusion in a new edition of the ISG.
- 4) To modify the ISG only after having assured that any change is consistent with the consolidated stratigraphic principles, and aims not only to facilitate communication between living geologists and other scientists but also to assure the continuity between past and future literature.
- 5) To make clear always to each member of an ICS body the distinction between scientific and conventional aspects of stratigraphy, in such a way that re-orienting their views and options is in a framework of agreed upon conventions and rules that contribute to maintaining a common language thereby ultimately enabling additional scientific progress.