

Preliminary AGSO scheme for standard database entry of sequence stratigraphic units

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To address the urgent problem of entering sequence stratigraphic units into AGSO's databases, a preliminary scheme for standardised database entry of these units has been drawn up and is being tested. This scheme focuses on those aspects that are the particular immediate concern of our databases, namely the definition and naming of these units. It does not deal with other aspects of sequence units such as Vail–Exxon vs Galloway-type units, or the basis for ranking units in hierarchies. The aim is to provide a quick result to fulfil immediate needs, and to be able to enter those units already published or about to be published. In the longer term, moves are under way to reach consensus on a national scheme for standards in the definition and naming of these units (Brakel 1999: APPEA Journal, 39(1), 485–493), but if this eventually produces a different scheme, the existing units in the databases can be linked to the new conventions. Comments from industry on the preliminary AGSO scheme are welcome.

Principles

The scheme is based on the following principles:

1. Formally define all sequences in a way similar to lithostratigraphic units but with variations that are peculiar to sequences — e.g., representative or type localities for sequence boundaries that can include outcrops, seismic line locations, and/or well intervals; biostratigraphic constraints; and methodology.
2. Use sequence boundaries as the defining parameters for sequence units (not type sections, lithology, etc.).
3. Names for sequences must be unique, and distinguishable from lithostratigraphic units.
4. Names of 1st-, 2nd-, and 3rd-order units must be proper names, not alphanumeric codes.
5. Use a digital hierarchy for subsequences and higher-order units — e.g., Dingo 1.2.3.
6. Avoid names that are age-specific — e.g., *M. australis* Sequence.
7. Preferably avoid naming the sequence boundary.
8. Allow the abbreviation of associated formation names — e.g., a sequence that contains mainly Riversleigh Formation strata can be called the River Sequence.
9. Allow the use of geographic names, including well names.
10. Invent other appropriate names that do not contravene the other rules. This will be particularly useful in areas where no names at all exist.
11. A term such as 'Sequence', 'Supersequence', 'Megasequence', etc., must always be attached to the name of a sequence stratigraphic unit.
12. Store the parent unit of a sequence unit in an appropriate database.
13. Record a standard abbreviation in the database for use when names are too long for maps, sections, etc.

Hypothetical example of how a sequence could be defined

Name and rank: White Gull Sequence

Derivation: White Gull 1 well, at lat. 11°30'S, long. 140°30'E.

Synonymy (if any): Upper part of Vindaloo Sequence of Jones (1985).

Distribution: Wildcat Basin, except for the NE side where it has been eroded away.

Lower bounding surface:

Type locality: Depth of 1532 m in the White Gull 1 well, which corresponds to SP551, TWT 498 ms in seismic section AZCO 1996–3.

Identifying features: 8° dip discordance on dipmeter log, strong spike on gamma-ray log, stratal termination surface in seismic section AZCO 1996–3.

Adjacent lithologies at the type locality: Limestone below the boundary, mudstone above.

Lithostratigraphic units at the type locality: Johns Limestone below, Bintang Formation above.

Age of rock below: Valanginian, *E. torynum* Zone.

Age of rock above: Valanginian, *S. areolata* Zone.

Regional aspects: Angular discordance decreases towards the centre of the basin.

Upper bounding surface:

Type locality: Depth of 1102 m in the White Gull 1 well, which corresponds to SP551, TWT 365 ms in seismic section AZCO 1996–3.

Identifying features: 3° dip discordance on dipmeter log, strong spike on gamma-ray log, stratal termination surface in seismic section AZCO 1996–3.

Adjacent lithologies at the type locality: Mudstone below the boundary, sandstone above.

Lithostratigraphic units at the type locality: Bintang Formation below, Dugong Formation above.

Age of rock below: Valanginian, *S. areolata* Zone.

Age of rock above: Valanginian, *S. tabulata* Zone.

Regional aspects: Becomes a correlative conformity in the centre of the basin.

Sequence regional aspects: Subaerially deposited sandstone-dominated succession along the eastern basin margin interfingers with paralic mudstone and sandstone westwards, and passes farther west into deep offshore mudstone-dominated rocks. Sequence thickens towards the palaeoshelf margin, but thins again in the deeper-water facies.

Constituent units: Composed of three 4th-order units, the White Gull 1 Subsequence, White Gull 2 Subsequence, and White Gull 3 Subsequence.

References:

Jones, W.H., 1985. A sequence framework for the Cretaceous of the Wildcat Basin. *Drill Here Journal*, 63, 119–137.

Example of naming sequences

The naming of sequences, both in AGSO and elsewhere, has been based in the past on a number of methods, most of which are inappropriate to the standards set out here. Names are typically non-unique and are commonly based on alphanumeric codes or age-specific names. Use of the geographic parts of formally defined lithostratigraphic names is also widespread. Ideally, only where a sequence stratigraphic unit and a lithostratigraphic unit are identical should the geographic name also be adopted. In practise the units are often not identical, but such usage is nevertheless common in the literature.

An example from the Browse Basin of how current usage might be revised is set out below according to the preliminary AGSO scheme. Alongside the published version is a possible revised scheme, which follows the principles identified herein. This revised scheme is based on well names. Where feasible, sequence names are derived from the reference well for that sequence.

Browse Basin sequence stratigraphy

<i>Published scheme</i>	<i>Possible revised scheme</i>
BB12	Arquebus Sequence
BB12C	Arquebus 3 Subsequence
BB12B	Arquebus 2 Subsequence
BB12A	Arquebus 1 Subsequence
BB11	Heywood Sequence
BB10	Caswell Sequence
BB9	Shell Sequence
BB8	Sheherazade Sequence
BB7	Perindi Sequence
BB6	Lacepede Sequence
BB5	Brecknock Sequence

Call for comments

The AGSO scheme should be compatible with industry methods of storing such data. We are therefore asking for industry feedback on this scheme, and greatly value any comments (positive or negative) that you can give us. Is this a practical way of handling the type of data your company deals with? If not, what changes should be made?

Please address your comments to us at the postal or email addresses annotated in the footnote below.

Acknowledgments

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