1. TITLE OF CONSTITUENT BODY and NAME OF REPORTERS

Subcommission on Triassic Stratigraphy (STS)

Mark W. Hounslow (Chair of STS, CNBWG chair), Chris McRoberts (STS Secretary), Charles Henderson & Yuri Zakharov (IOBWG chair and sec.), Spencer Lucas (OABWG chair).

2. OVERALL OBJECTIVES AND FIT WITHIN IUGS SCIENCE POLICY

- Definition of stage boundaries and selection of GSSP sections.
- Rationalization of chronostratigraphic classification for the Triassic.
- Inter-calibration of all stratigraphic tools and promoting globally significant data to achieve this.
- Establishment of physical, cyclostratigraphic and chemo-stratigraphic scales.
- Correlation of Triassic successions and events including marine to non-marine.

3. ORGANISATION - interface with other international projects / groups

The STS is a Subcommission of the International Commission on Stratigraphy, with 3 executive officers and 23 voting members of the STS and about 110 corresponding members. The secretary is the editor of the online *Albertiana* and manages the web site and posts for STS announcements and task group discussions. The *Albertiana* editor is supported by an editorial team of ten drawn from the voting and corresponding members.

Interfaces : a) IGCP 630: "*Permian-Triassic climatic and environmental extremes and biotic response", leader* Zhong-Qiang Chen. Interconnection is relevant to the Olenekian and Anisian Working Groups. Members of the Induan-Olenekian Boundary Working Group (IOBWG) attended a field a meeting Wuhan in May, 2018. b) The non-marine project group works with IGCP 632 ("Continental Crises of the Jurassic") and "International Permian-Triassic Workshops" organised annually by Gerhard Bachmann.

3a. Nominated Officers for 2016-2020

Chair: Mark W. Hounslow, Lancaster Environment Centre, Lancaster University, UK;
Vice-Chair: Wolfram M. Kürschner, UiO Department of Geosciences ,Oslo, Norway
Secretary: Christopher A. McRoberts, Geology Department, SUNY, Cortland, New York, USA

4. EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

Funding for some participants of the IOBWG for the Wuhan meeting in China, May 22-24 was provide by China University of Geosciences, Wuhan.

5. CHIEF ACCOMPLISHMENTS IN 2018.

Norian GSSP candidate; Pizzo Mondello, Sicily: With the publication of Rigo et al. (2018) and Mazza et al. (2018), which deal with the conodont taxonomic issues connected with the Pizzo Mondello candidate the major obstacle in the way of making progress on this boundary has been bridged. In Oct-Nov 2018, a new Norian working group was assembled to move forward towards a discussion, report compilation and vote on the two proposed candidates. In addition Sr-isotope work on the Pizzo Mondello section has been published by Onoue et al. (2018).

Olenekian GSSP: During a 3-day symposium "International symposium on deep-time environmental & climatic extremes and biotic responses" (Wuhan, Chin, May 22-24, 2018), the IOBWG chaired by Yuri Zakharov (Secretary of the WG) met to discuss the GSSP candidate sections connected with conodont (e.g. Lyu et al. 2018; Henderson et al. 2018) and ammonoid biostratigraphy issues. They also visited the Chaohu candidate section.

Anisian GSSP: Spencer Lucas has accepted the task of leading a new WG on the Olenekian-Anisian boundary, and has been promoting ideas about possible new candidate sections. Sections in China (e.g.

Gaundao; Li et al. 2018; Chen et al. 2018) remain some of the strongest possibilities, but so far have not been formally proposed.

5a. Publications of the working groups:

Chen, J., Zhao, L., Algeo, T. J., Zhou, L., Zhang, L. & Qiu, H. (2018). Evaluation of paleomarine redox conditions using Mo-isotope data in low-[Mo] sediments: A case study from the Lower Triassic of South China. Palaeogeography, Palaeoclimatology, Palaeoecology. doi.org/10.1016/j.palaeo.2018.05.004

Geyer, G. & Kelber, K. P. (2018). Spinicaudata ("Conchostraca," Crustacea) from the Middle Keuper (Upper Triassic) of the southern Germanic Basin, with a review of Carnian–Norian taxa and suggested biozones. PalZ, 92, 1-34.

Henderson, C. M., Golding, M. L. & Orchard, M. J. (2018). Conodont sequence biostratigraphy of the Lower Triassic Montney Formation. Bulletin of Canadian Petroleum Geology, 66, 7-22.

Jin, X. McRoberts, C. Shi, Z. Mietto, P. Rigo, M. Roghi, G. Manfrin, S. Franceschi, M.,& Preto, N. (2018). The aftermath of the CPE and the Carnian/Norian transition in northwestern Sichuan Basin, South China. Journal of the Geological Society. doi.org/10.1144/jgs2018-104.

Khalil, H., C. McRoberts, N. Del Piero, G. Stanley, R. Martini & S. Rigaud. (2018). New biostratigraphic constraints for the Martin Bridge Formation (Upper Triassic, Wallowa terrane, Oregon, U.S.A.). Revue de Paléobiologie, 37, 109-119.

Kohút, M., Hofmann, M., Havrila, M., Linnemann, U. & Havrila, J. (2018). Tracking an upper limit of the "Carnian Crisis" and/or Carnian stage in the Western Carpathians (Slovakia). International Journal of Earth Sciences, 107, 321-335.

Kustatscher, E., Ash, S. R., Karasev, E., Pott, C., Vajda, V., Yu, J., & McLoughlin, S. (2018). Flora of the Late Triassic. In: Tanner, L. (ed). The Late Triassic World, Springer,pp. 545-622.

Li, M., C. Huang, L. Hinnov, W. Chen, J. Ogg, W. Tian. (2018). Astrochronology of the Anisian stage (Middle Triassic) at the Guandao reference section, South China. Earth and Planetary Science Letters, 482, 591-606.

Lyu, Z., Orchard, M. J., Chen, Z. Q., Zhao, L., Zhang, L. & Zhang, X. (2018). A Taxonomic Re-Assessment of the Novispathodus waageni Group and Its Role in Defining the Base of the Olenekian (Lower Triassic). Journal of Earth Science, 29, 824-836.

Maekawa, T., Komatsu, T. & Koike, T. (2018). Early Triassic Conodonts from the Tahogawa Member of the Taho Formation, Ehime Prefecture, Southwest Japan. Paleontological Research, 22, 1-62.

Mazza, M., Nicora, A. & Rigo, M. (2018). Metapolygnathus parvus Kozur, 1972 (Conodonta): a potential primary marker for the Norian GSSP (Upper Triassic). Bollettino della Società Paleontologica Italiana, 57, 81-101.

Muto, S., Takahashi, S., Yamakita, S., Suzuki, N., Suzuki, N. & Aita, Y. (2018). High sediment input and possible oceanic anoxia in the pelagic Panthalassa during the latest Olenekian and early Anisian: Insights from a new deep-sea section in Ogama, Tochigi, Japan. Palaeogeography, Palaeoclimatology, Palaeoecology, 490, 687-707.

Nowak, H., Schneebeli-Hermann, E. & Kustatscher, E. (2018). Correlation of Lopingian to Middle Triassic Palynozones. Journal of Earth Science, 29, 755-777.

Onoue, T., Yamashita, K., Fukuda, C., Soda, K., Tomimatsu, Y., Abate, B. & Rigo, M. (2018). Sr isotope variations in the Upper Triassic succession at Pizzo Mondello, Sicily: Constraints on the timing of the Cimmerian Orogeny. Palaeogeography, Palaeoclimatology, Palaeoecology, 499, 131-137.

Paterson, N. W., Mangerud, G., Holen, L. H., Landa, J., Lundschien, B. A., & Eide, F. (2018). Late Triassic (early Carnian–Norian) palynology of the Sentralbanken High, Norwegian Barents Sea. Palynology, 1-23.

Rigo, M., Mazza, M., Karádi, V., & Nicora, A. (2018). New Upper Triassic Conodont Biozonation of the Tethyan Realm. In: Tanner, L. (ed). The Late Triassic World (pp. 189-235). Springer.

Yamashita, D., Kato, H., Onoue, T. & Suzuki, N. (2018). Integrated Upper Triassic conodont and radiolarian biostratigraphies of the Panthalassa Ocean. Paleontological Research, 22, 167-197.

Zaffani, M., Jadoul, F. & Rigo, M. (2018). A new Rhaetian δ 13 C org record: carbon cycle disturbances, volcanism, end-Triassic mass extinction. Earth-science reviews. 178, 92-104.

Zakharov, Y. D., Horacek, M., Popov, A. M. & Bondarenko, L. G. (2018). Nitrogen and carbon isotope data of Olenekian to Anisian deposits from Kamenushka/South Primorye, Far-Eastern Russia and their palaeoenvironmental significance. Journal of Earth Science, 29, 837-853.

9. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR:

Norian GSSP: The plan is to move forward towards a vote on the boundary marker and GSSP section. This will be achieved by 1) the preparation of document detailing the correlation potential of suitable markers, and details on the candidate sections by the WG member for in early 2019. 2) Face to face discussions will then take place at STRATI2019 in, a) late Triassic presentation sessions, and b) a meeting of the STS. Following this the plan is to move towards a vote in late 2019.

Olenekian GSSP: During 2019 it is planned to complete collation of information from IOBWG members to produce a document for distribution among all the group, as a prelude to discussion and moving to a vote within the WG before the end of 2019. Lower Triassic sessions and the STS meeting at STRATI2019 in July should allow some time for problems to be resolved and new ideas to be developed. The goal of the WG chair is to have a GSSP proposal to submit to STS for ratification in early 2020.
Anisian GSSP: It is hoped that Lucas can encourage additional formal proposals for Anisian GSSP candidate sections, since the Desli Caira section in Romania (the only one formally proposed) is unlikely to move forward, an important step which will bridge the major stumbling block at this boundary.

10. KEY OBJECTIVES AND WORK PLAN FOR 2018-2020

- Norian and Olenekian GSSP: Both move towards preparing a discussion document among the working group members, as a prelude to moving towards a vote on the candidate markers and sections.
- Anisian GSSP: Obtaining formal proposals for new candidate sections in South China.
- Rhaetian GSSP: A 2-3 year stasis in this group has seen no significant prospects of change. If this continues into early 2019, a new chair of this working group will be sought to move forward at a faster pace.

APPENDIX [Names and Addresses of Current Officers and Voting Members)

STS Chair: Mark W. Hounslow, Lancaster Environment Centre, Lancaster University, UK; (m.hounslow@lancaster.ac.uk.)
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~110 STS corresponding members, not listed here			

Chairs of the Working Groups of the unresolved GSSP boundaries

Base Rhaetian Working Group, M. Balini.
Base Norian Working Group, M. W. Hounslow
Base Anisian Working Group, S. Lucas
Base Olenekian Working Group, C. M. Henderson.