I.A.G./A.I.G. DENUCHANGE Annual Report 2019

Denudation and Environmental Changes in Different Morphoclimatic Zones - DENUCHANGE

(http://www.geomorph.org/denuchange-working-group/)

The I.A.G. / A.I.G. Working Group DENUCHANGE (Denudation and Environmental Changes in Different Morphoclimatic Zones) was approved during the 9th International Conference on Geomorphology (9th ICG) in New Delhi, India, 6-11 November 2017, for a four-year period (2017-2021).

1. **Activities since March 2018:**

- DENUCHANGE planning meeting during the EGU General Assembly 2018 (Vienna, Austria, 8-13 April 2018) (http://meetingorganizer.copernicus.org/EGU2018/session/29441)
- DENUCHANGE scientific session section at the EGU General Assembly 2018 (Vienna, Austria, 8-13 April 2018) (http://meetingorganizer.copernicus.org/EGU2018/session/27438)
- First DENUCHANGE workshop "Denudation and Environmental Changes in Different Morphoclimatic Zones" (25-27 September 2018, Storkowo-Szczecinek, Poland)

1.1. The I.A.G./A.I.G. financial support 2018 (500 Euros) for DENUCHANGE was used for the First DENUCHANGE workshop, 25-27 September 2018, Storkowo-Szczecinek, Poland:

The First DENUCHANGE workshop was successfully organized by Zbigniew Zwoliński together with Joanna Gudowicz, Mikołaj Majewski, Małgorzata Mazurek, Józef Szpikowski, Marcin Winowski and Achim A. Beylich, and was kindly hosted by the Geoecological Station in Storkowo belonging to the Adam Mickiewicz University (AMU) in Poznań. The workshop included an introductory meeting with an introductory lecture by Achim A. Beylich on *The new I.A.G./A.I.G. Working Group on Denudation and Environmental Changes in Different Morphoclimatic Zones (DENUCHANGE): Scientific need, key research questions and planned activities*, followed by extended discussions on the organization and scientific key focus of DENUCHANGE, an invited keynote lecture by Olav Slaymaker on *A global perspective on denudation rates: complexity compounded by contemporary anthropogenic and climatic changes* as well as invited introductory lectures by Zbigniew Zwoliński on *The pattern of morphoclimatic zones on the Earth*, Wiesława E. Krawczyk on the *Estimation of the chemical denudation rate*, Adam Łajczak on *Mechanical denudation of selected areas in Europe*, and Małgorzata Mazurek on the *Delivery of denudational material for fluvial transport in a lowland catchment*. In addition, two practical workshops on the *Estimation of the chemical denudation rate* and *on Denudation modelling with SWAT* were organized by Wiesława E. Krawczyk and Joanna Gudowicz for the workshop participants.

Eight oral and nineteen poster presentations were given by workshop participants spanning a wide spectrum of aspects related to denudation in various morphoclimatic zones.

During the workshop the analytical laboratories, the meteorological station and the hydrological station of the AMU Geoecological Station in Storkowo were presented and a half-day fieldtrip introduced the workshop participants to the upper Parsęta River catchment where fluvial denudation processes and soil/slope erosion within experimental and channel head catchments in a temperate environment were discussed.

Lecture on state environmental monitoring in Poland by Andrzej Kostrzewski (photo by Józef Szpikowski).

At the upper Parsęta river. Explanation of the monitoring programme by Zbigniew Zwoliński (photo by Józef Szpikowski).

The 28 participants from 8 different countries (Austria, Brazil, Canada, France, Israel, Norway, Poland, Romania) shared their ideas and discussed various aspects of denudation in a range of different morphoclimatic zones including cold regions, temperate regions, semi-arid / arid regions and tropical regions which were selected as morphoclimatic zones of particular interest for the DENUCHANGE working group.

Selected oral and poster contributions from the workshop have been published in the journal *Landform Analysis, vol. 36, 2018 (Editor-in-Chief Zbigniew Zwoliński)* (http://sgp.org.pl/la/).

Progress was made in defining a concisely formulated ***DENUCHANGE Working Group Objective.***

1.2. I.A.G./A.I.G. DENUCHANGE Working Group Objective:

(http://www.geomorph.org/denuchange-working-group/)

The key question of DENUCHANGE is:

What are the contemporary chemical and mechanical denudation rates in different morphoclimatic zones on the Earth?

Denudation, including both chemical and mechanical processes, is of high relevance for Earth surface and landscape development and the transfer of solutes and sediments from

headwater systems through main stem of drainage basin systems to the world oceans. Denudation is controlled by a range of environmental drivers and can be significantly affected by anthropogenic activities.

The better understanding of possible effects of ongoing and accelerated environmental changes on present-day denudation requires systematic and quantitative studies (environmental monitoring) on the actual drivers of denudational processes. Only if we have an improved knowledge of drivers and quantitative rates of contemporary denudational hillslope and fluvial processes as well as of the connectivity in landscapes and between hillslope and fluvial systems across a range of different selected climatic environments, possible effects of global environmental changes on denudation can be better assessed. Special focus will be given to selected morphoclimatic zones that are expected to react particularly sensitively to ongoing and accelerated environmental changes, and the key focus of DENUCHANGE will therefore be on (i) cold regions (including glacierized, glaciated and unglaciated cold climate environments), (ii) temperate regions, (iii) arid / semi-arid regions and (iv) tropical regions. The different morphoclimatic zones are defined by morphometric characteristics/signatures detected in the various zones.

DENUCHANGE will

- Provide a detailed compilation and comparison of contemporary chemical and mechanical (drainage-basin wide) denudation rates in selected and clearly defined drainage basin systems in selected cold regions, temperate regions, arid / semi-arid regions and tropical regions worldwide. As denudation is scale-dependent, the selected drainage basin systems will be of a defined and comparable size to allow direct comparisons between the drainage basin systems situated in the different morphoclimatic zones. The existing/available and compiled data on contemporary chemical and mechanical denudation must be based on comparable sampling periods, sampling frequencies, and on comparable monitoring methods and techniques applied.
- Provide a process-oriented, coordinated and integrated analysis and compilation of the respective key drivers of contemporary denudation occurring under the different present-day morphoclimates.
- Based on the previous two compilations: Address the key question how environmental changes are affecting contemporary denudation rates in different morphoclimates. This also includes human activities in different morphoclimatic zones, in the context of environmental changes in the Anthropocene.

Participants of the 1st DENUCHANGE Workshop during the field excursion (photo by Monika Domańska).

Further information on the First DENUCHANGE Workshop, including the Workshop Programme and the Book of Abstracts, as well as on the DENUCHANGE Working Group and on the defined DENUCHANGE Working Group Objective is available at the DENUCHANGE website under http://www.geomorph.org/denuchange-working-group/.

2. Forthcomings in the year 2019:

- DENUCHANGE scientific session *GM7.2 Denudational hillslope and fluvial processes, sedimentary budgets, and landscape responses to global environmental changes* at the EGU General Assembly 2019 (7-12 April 2019, Vienna, Austria): https://meetingorganizer.copernicus.org/EGU2019/session/30448
- Second DENUCHANGE Workshop, 12-14 September 2019, Calpe, Spain: http://www.geomorph.org/denuchange-working-group/
- DENUCHANGE scientific session *S04. Denudation in the Mediterranean Zone* at the Regional Conference on Geomorphology, 19-21 September 2019, Athens, Greece: https://rcg2019.com/

3. DENUCHANGE Steering Committee:

Chair:

Dr. Achim A. Beylich (Norway) (achim.beylich@geofieldlab.com)

Co-Chairs:

Dr. Luca Mao (UK) (lumao@lincoln.ac.uk)

Prof. Zbigniew Zwoliński (Poland) (zbzw@amu.edu.pl)

Steering Committee and initial Core Group members:

Dr. Achim A. Beylich (Norway) (Chair)

Dr. Piotr Cienciala (USA)

Dr. Marta Della Seta (Italy)

Prof. John C. Dixon (USA)

Dr. Joanna Gudowicz (Poland)

Prof. Jasper Knight (South Africa)

Dr. Katja Laute (Norway)

Dr. Luca Mao (UK) (Co-Chair)

Prof. Małgorzata Mazurek (Poland)

Dr. David Morche (Germany)

Prof. Zbigniew Zwoliński (Poland) (Co-Chair)

Selbustrand/Trondheim, 25 March 2019

Achim A. Beylich

Chair of I.A.G./A.I.G. DENUCHANGE