



Current status and further development of Eurocodes in Montenegro

Prepared by Ljiljana Šoškić, Standardization Leading Engineer, Institute for Standardization of Montenegro

Basic information on Montenegro

- The declaration of independence of Montenegro in 2006 ended the state union with Serbia
- Area ~ 14.000 km²
- Population ~ 620.000



Authorities

- **Ministry of Economy** – realization of planned activities throughout annual contracts on standards preparation;
- **Ministry of Sustainable Development and Tourism of Montenegro** - preparation of regulations in the field of spatial planning, construction and urban planning;
- **Institute for Standardization of Montenegro (ISME)** – adopting standards and related documents;
- **Institute of Hydro-meteorology and Seismology of Montenegro** (maps of wind, snow, isotherms and seismic hazards);
- **Faculty of Civil Engineering in Podgorica** – general trainings and
- **Chamber of Engineering of Montenegro (IKCG)** – practical training of engineers.

Relevant national regulations

- Law on the Arrangement of Space and Construction of Facilities (2008/2014) and Regulations adopted based on the Law (2017);
- Law on Space Planning and Construction of Facilities (2008/2014) and Regulations adopted based on the Law (2018);
- Regulations inherited from the previous common state (SFRY, FRY and S&M) referring to JUS standards;
- Law on Construction Products that partially transposes EU Regulation No 305/2011 and Regulations adopted based on the Law (2016/2017);
- IPA twinning project - Eurocodes (2012-2013);
- Action plan for adopting and implementing of Eurocodes (adopted by Government of Montenegro in January 2014)

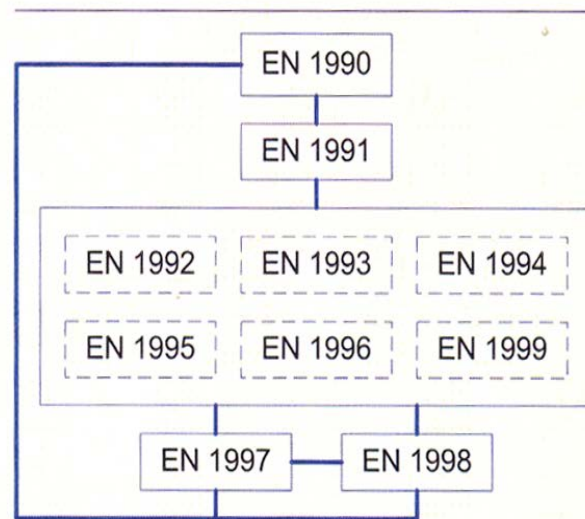
Engagement of the relevant institutions

Institute for Standardization of Montenegro



- April 2007 – Government of Montenegro established Institute for Standardization of Montenegro (ISME), which is nationally engaged in standardization work;
- Aiming to transpose Directive on Construction Products (89/106/EEC) i.e. Regulation No 305/2011 into national legislation, ISME adopted harmonized standards following relevant regulation;
- In July 2011, ISME established Technical Committee ISME/TK 002: Eurocodes governing process of adopting and implementing of Eurocodes;
- In September 2012, it was established 8 groups for all parts of Eurocodes within TC.

Tehnická Komiteta ISME/TK 002: Eurocodes – groups



EC 0 – EN 1990

EC 1 – EN 1991, EN 1996

EC 2 – EN 1992

EC 3 – EN 1993, EN 1999

EC 4 – EN 1994

EC 5 – EN 1995

EC 6 – EN 1998

EC 7 – EN 1997

ISME/TK 002: Eurocodes

So far, it was adopted and translated in Montenegrin language 15 parts of Eurocodes and developed national annexes for them with appropriate NDPs.

- 1. MEST EN 1990:2013; MEST EN 1990:2013/NA:2013**
- 2. MEST EN 1998-1:2015; MEST EN 1998-1:2015/NA:2015**
- 3. MEST EN 1991-1-4:2016; MEST EN 1991-1-4:2016/NA:2016**
- 4. MEST EN 1991-1-1:2017; MEST EN 1991-1-1:2017/NA:2017**
- 5. MEST EN 1991-1-3:2017; MEST EN 1991-1-3:2017/NA:2017**
- 6. MEST EN 1991-1-5:2017; MEST EN 1991-1-5:2017/NA:2017**
- 7. MEST EN 1992-1-1:2017; MEST EN 1992-1-1:2017/NA:2017**
- 8. MEST EN 1996-1-1:2017; MEST EN 1996-1-1:2017/NA:2017**
- 9. MEST EN 1996-3:2017; MEST EN 1996-3:2017/NA:2017**
- 10. MEST EN 1997-1:2017; MEST EN 1997-1:2017/NA:2017**
- 11. MEST EN 1998-3:2017; MEST EN 1998-3:2017/NA:2017**

- 12. MEST EN 1991-1-2:2018;MEST EN 1991-1-2:2018/NA:2018**
- 13. MEST EN 1991-1-6:2018;MEST EN 1991-1-6:2018/NA:2018**
- 14. MEST EN 1991-1-7:2018;MEST EN 1991-1-7:2018/NA:2018**
- 15. MEST EN 1992-1-2:2018;MEST EN 1992-1-2:2018/NA:2018**

ISME negotiated with the Ministry of Economy to translate and develop national annexes for additional 15 parts of Eurocodes up to the end of 2018.

There are 6 parts in the drafting phase such as:

- 1. rnMEST EN 1991-2;**
- 2. rnMEST EN 1992-2;**
- 3. rnMEST EN 1993-1-1;**
- 4. rnMEST EN 1993-1-8;**
- 5. rnMEST EN 1995-1-1;**
- 6. rnMEST EN 1997-2.**

Releasing these documents for Public Enquiry process is expected in the midst of June 2018.

MEST EN 1998-1 NDPs: responsibility of Institute for Hydro-meteorology and Seismology

Seismic hazard of Montenegro

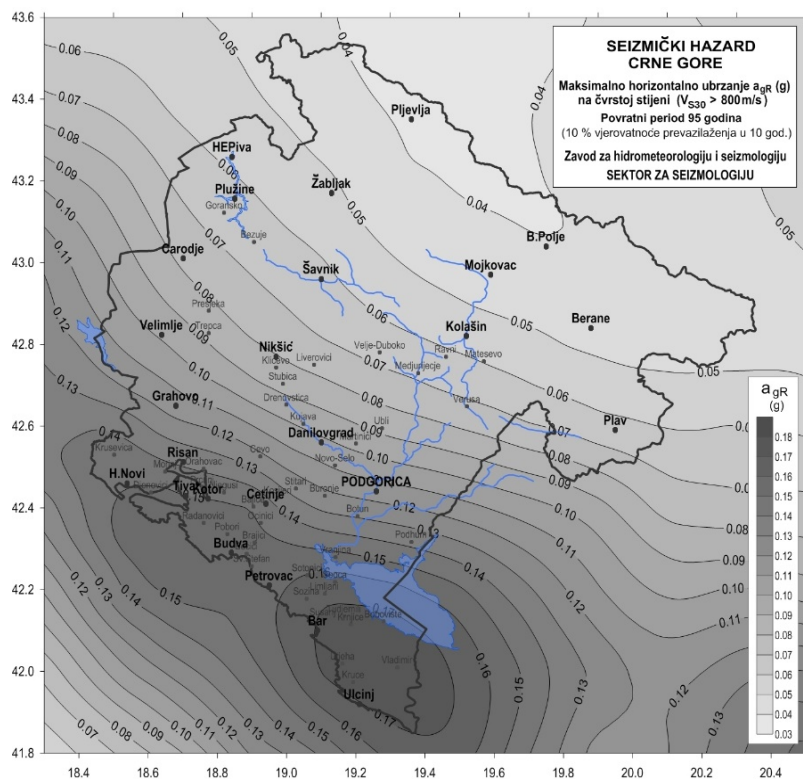


Figure C.1 Isolines of reference horizontal acceleration of soil a_{gR} in parts of gravity acceleration of Earth g ($g = 9.81 \text{ m/s}^2$) for a return period of 95 years

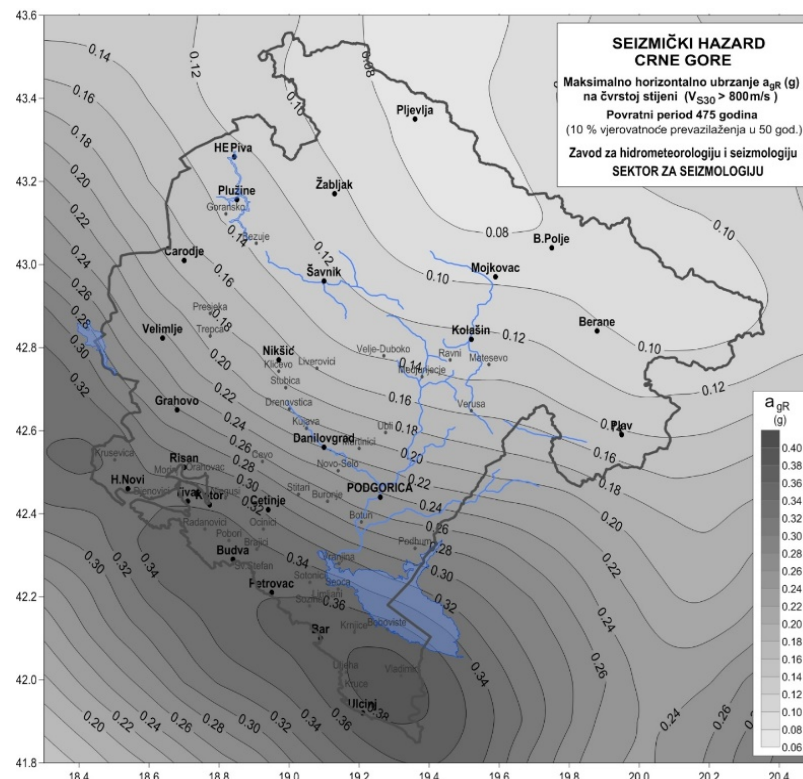
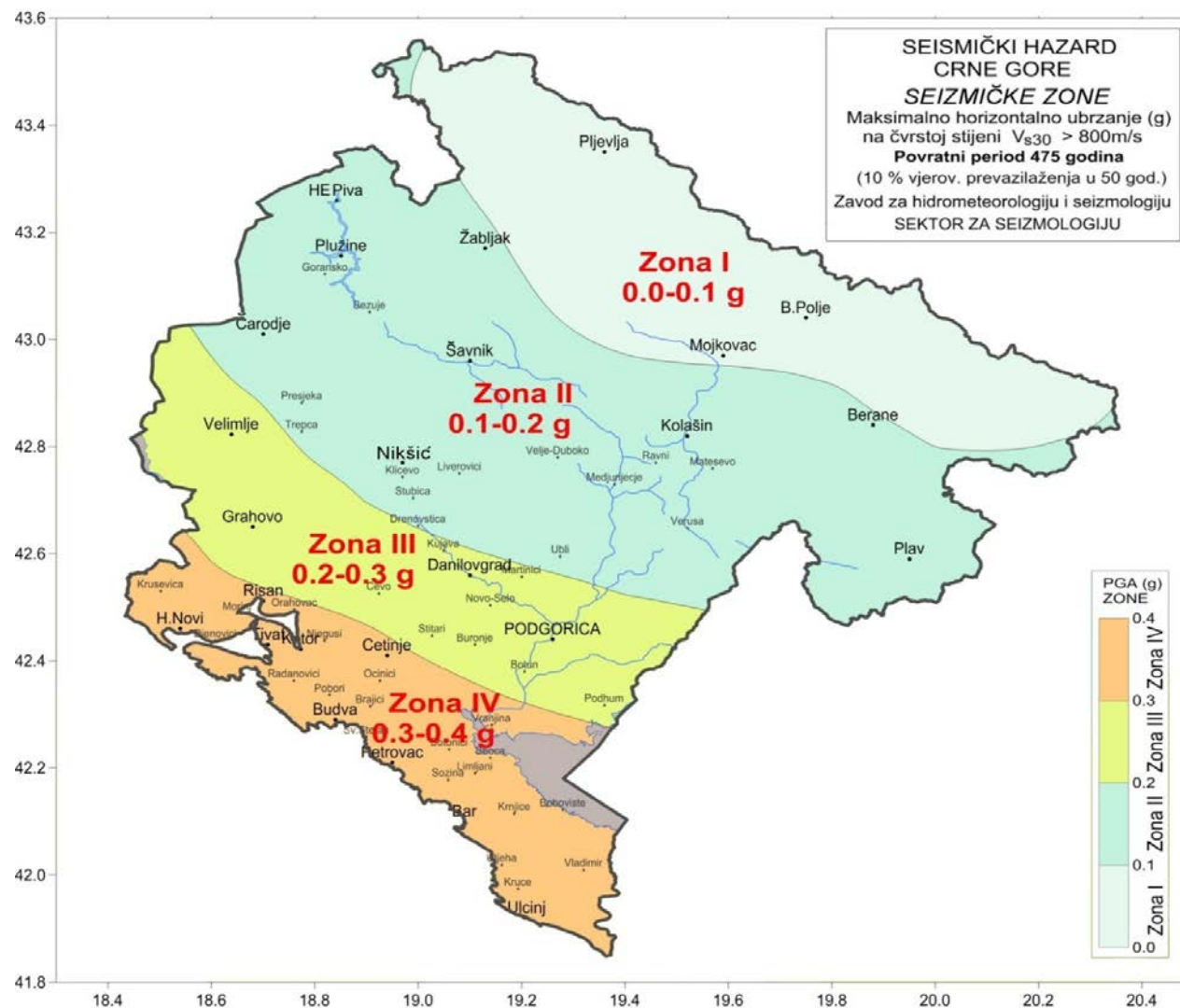
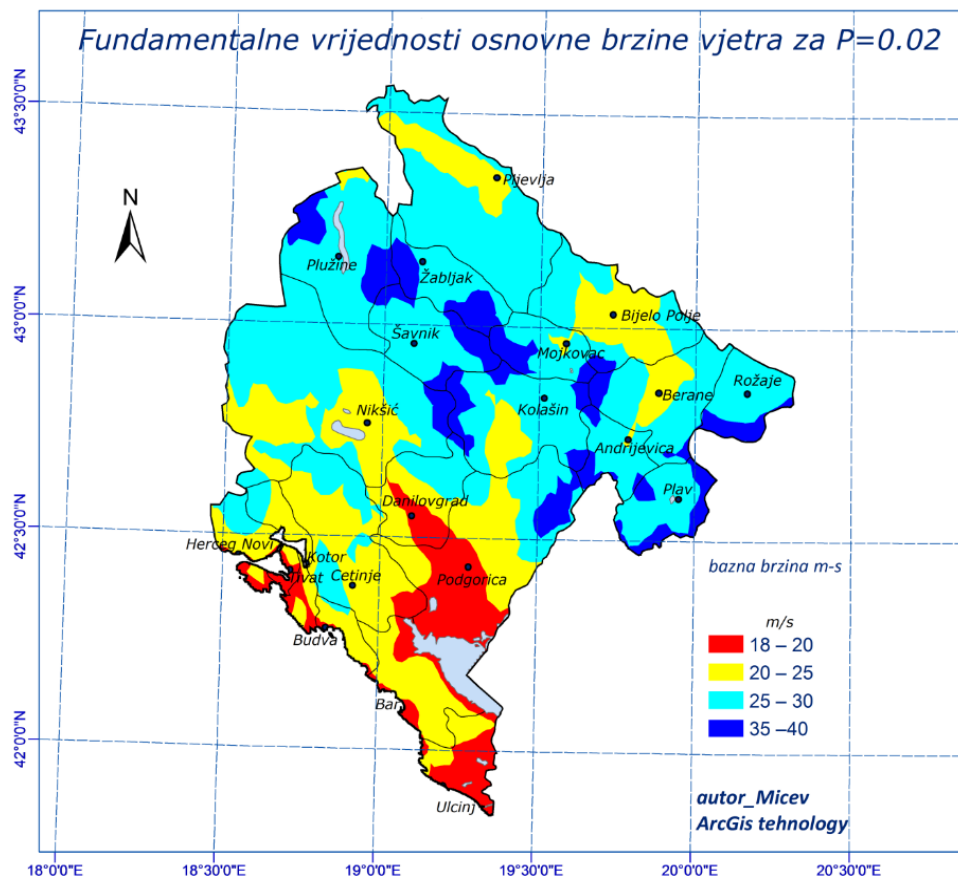


Figure C.2 Figure C.1 Isolines of reference horizontal acceleration of soil a_{gR} in parts of gravity acceleration of Earth g ($g = 9.81 \text{ m/s}^2$) for a return period of 475 years



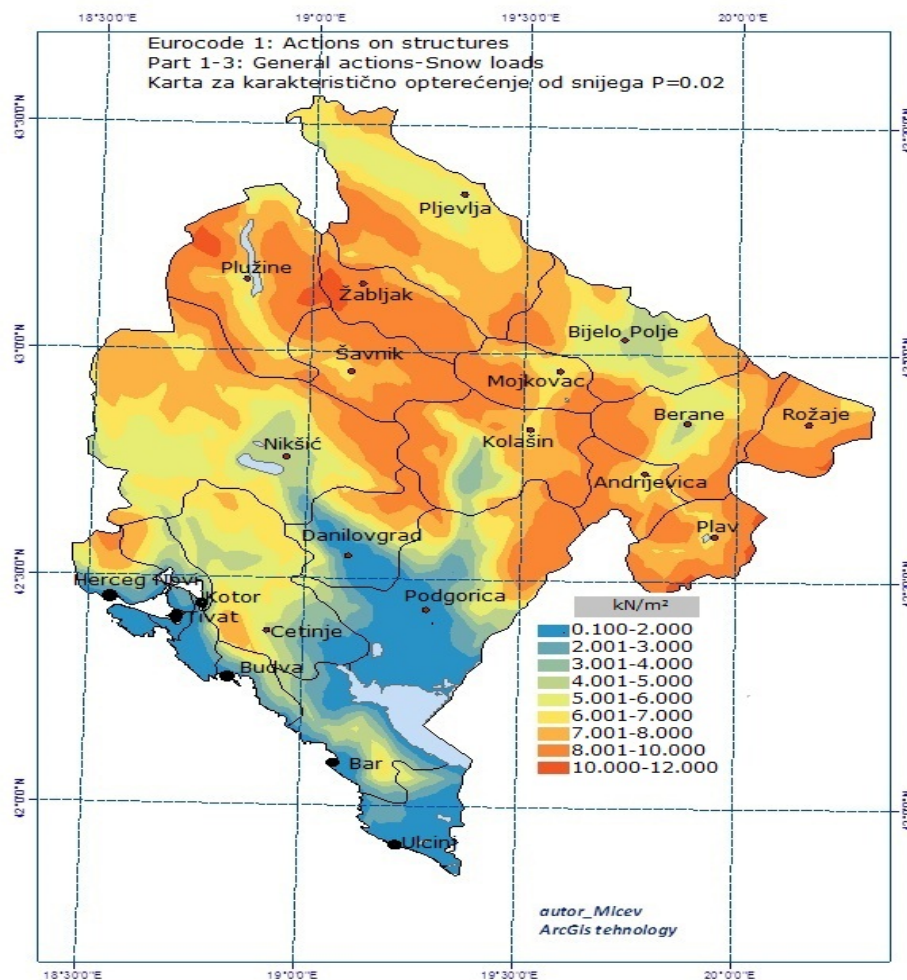
Seismic zones of Montenegro

MEST EN 1991-1-4 NDPs



Fundamental values of
basic wind speed $v_{b,0}$

MEST EN 1991-1-3 NDPs



s_k - Characteristic snow loads

MEST EN 1991-1-5 NDPs

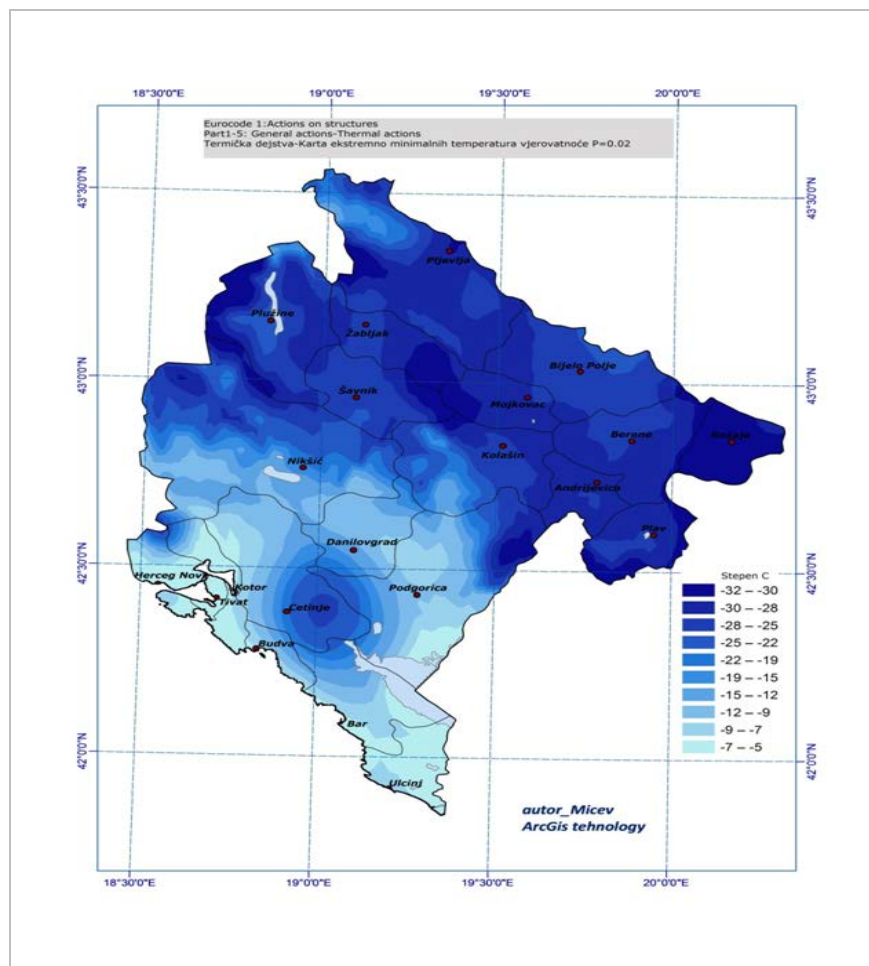


Zone 1- sea-side area and mountain hinterland

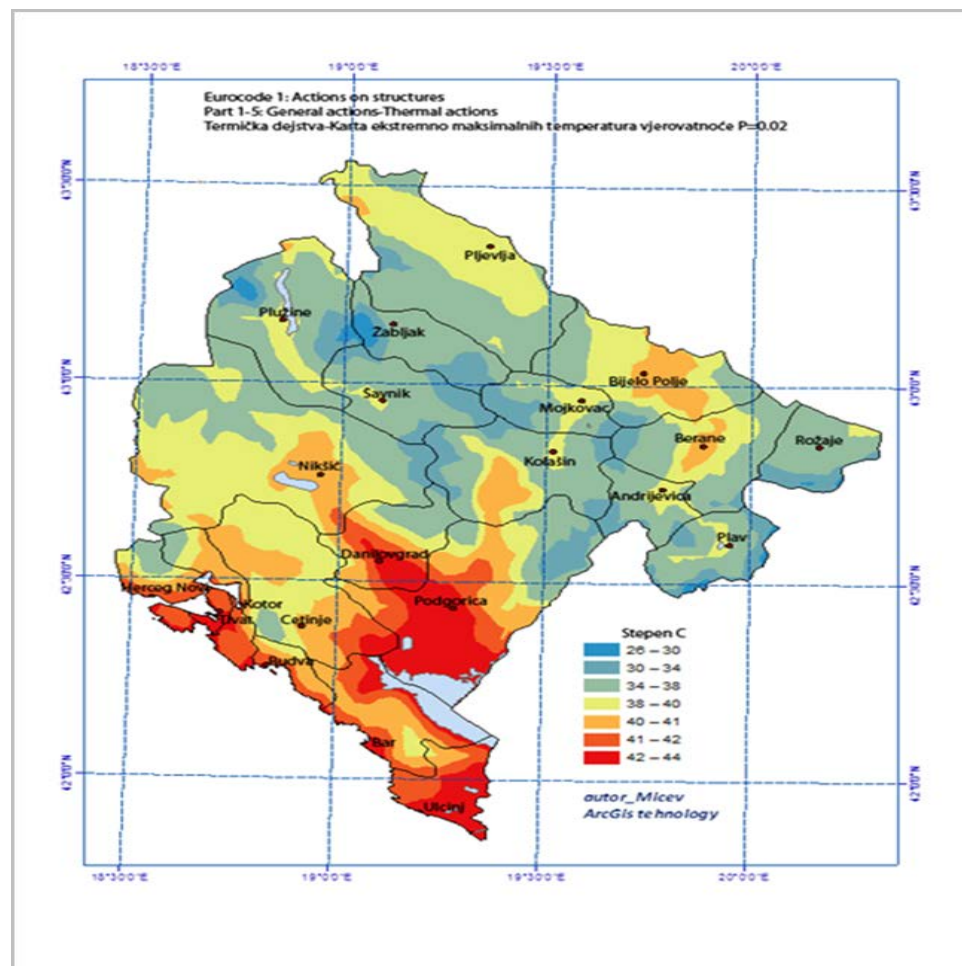
Zone 2 - continental part of Montenegro

Border - line separating zone 1 and zone 2 is followed by mountain cliff between sea-side and continental part of Montenegro

Map of extreme minimum (Tmin) temperatures



Map of extreme maximum temperatures (Tmax)



Faculty of Civil Engineering related activities

- Through its expert teams, it is engaged in translating of Eurocodes and developing relevant national annexes;
- ECTS Catalogue has been adopted with new Eurocodes contents (it has been launched implementation);
- National experts attended workshops on Eurocodes: Brussels (2008 & 2011), Lisbon (2012), Dublin (2013), then visited ASI, DIN and DIBt (2013);
- Every two years the Faculty organizes Symposiums on constructions - From Theory to Practice, partly devoted to Eurocodes implementation;
- In the last few years, in more than 40 cases, PhD and Master theses as well as final diploma works were prepared with the subjects on Eurocodes.

Several seminars on Eurocodes organized by Montenegrin Chamber of engineers and Civil Engineering Faculty

- First informative seminar on *Eurocodes implementation in Montenegro, 2009*
- Round table *EU standards: EC 0 and EC 1, 2010*
- Several conferences on *Eurocodes topics, 2010-2012*
- Round table on *Construction products and European regulations, 2013,*
- Second informative seminar on *Eurocodes implementation, 2013, etc.*



Seminars held in October 2013 covered the following topics:

- Overview and comparison of Eurocodes and existing National rules
- Explanation of Eurocode EN 1990
- EN 1991-1-1: Densities, self-weight, imposed loads for buildings
- EN 1991-1-3: Snow loads
- EN 1991-1-4: Wind action
- EN 1991-1-5: Thermal action
- EN 1998: Earthquakes - basic rules
- EN 1998: Seismic actions and rules for buildings
- EN 1992: Design of concrete structures
- EN 1993: Design of steel structures
- EN 1996: Design of masonry structures

Expectations, specific problems and needs

- In line with the Action Plan, we expect that the adoption and implementation of Eurocodes will be finalized by the end of 2019, including the period of coexistence with the old regulations;
- Small industrial capacities and consequently less possibility to include business entities;
- Education on all levels in Eurocodes implementation, especially for civil engineers;
- We need more Eurocodes related international projects to improve the knowledge and experience.

***THANK YOU FOR THE
ATTENTION!***