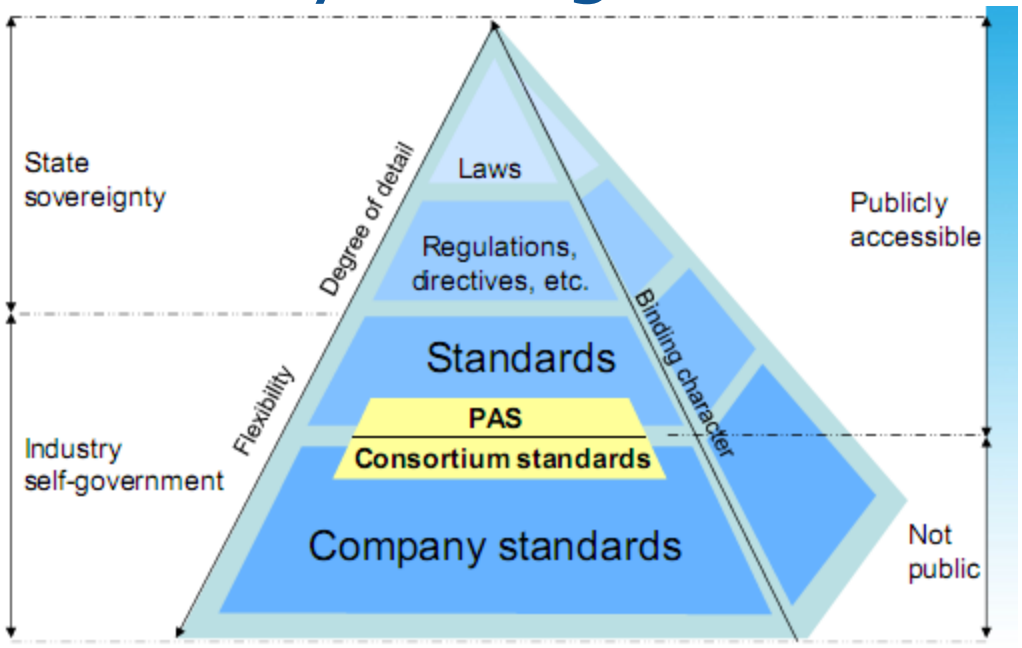
European Commission

EUROCODES AND NATIONAL ANNEXES IN SERBIA – CURRENT SITUATION

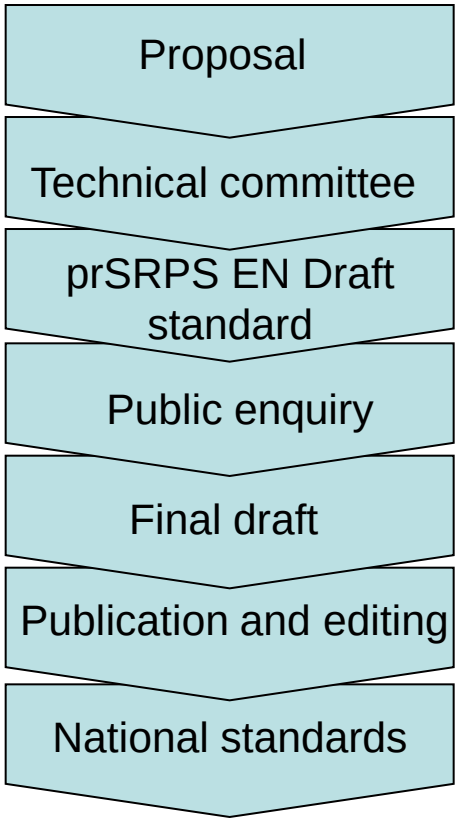
Eurocodes are used as reference documents for the following purposes:

- As a means of ensuring compliance of building and civil engineering structures with the relevant requirements
- As the basis for determining the contracts for buildings and related engineering services;
- As a framework for the development of harmonized technical specifications for construction products;

Standards within the legal system: the hierarchy of regulations



The standardization process at national level



ISS technical committees related to Eurocodes

ISS technical committee	Eurocode	Committee title
U250-1,8	EC0; EC1; EC8	Basis of structural design, Actions on structures, Design of structures for earthquake resistance
U250-2	EC2	Design of concrete structures
U250-3,4,9	EC3; EC4; EC9	Design of steel structures, Composite steel and concrete structures Aluminium structures
U250-5,6	EC5; EC6	Design of timber Design of masonry structures
U182	EC7	Geotechnical design

Institutions participated in committees

Faculties:

- Faculty of Civil engineering (University of Belgrade)
- Faculty of Technical Sciences – Department of Civil Engineering and Geodesy(University of Novi Sad)
- Faculty of Civil engineering (University of Niš)
- Faculty of Mining and Geology (University of Belgrade)
- Faculty of Architecture (University of Belgrade)

Institutes:

- Seismological Survey Institute of Serbia (Belgrade)
- Institute for Testing Materials – IMS (Belgrade)
- Hydro Meteorological Institute of Serbia (Belgrade)

Other stakeholders:

- Representatives of Companies for design, consult and performance of civil engineering structures

Structure

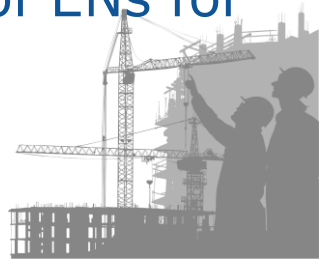
- Eurocodes include recommended values for nationally determined parameters (NDPs) which can be adopted by Member States. Member States are responsible for national safety levels which are based on geographical, climatic or other factors.

- National Annexes include the NDPs valid in each Member State as well as non-contradictory complementary information (NCI or NCCI), i.e. additional information which does not conflict with European Standards.

- National Annexes in Serbia are published as separate standards.

History of Eurocodes in Serbia

- 1995–1997. All most imortant parts (19) of European prestandards - ENV (EC1-EC8) have been translated; Siposium has been held in Belgrade;
- 2006. Five parts of Eurocodes (EN1990, EN1992-1-1, EN 1993-1-1, EN 1993-1-8 and EN 1994-1-1 have been translated; Four simposiums have been held in Belgrade, Novi Sad, Niš and Podgorica (Project supported by European Integration Fond);
- 2009. Next 12 parts of Eurcodes (EN1991-1-1, EN1991-1-3, EN1991-1-4, EN1991-1-5, EN1993-1-3, EN1993-1-5, EN1993-1-10, EN1995-1-1, EN1996-1-1, EN1997-1, EN1998-1, EN1998-3) have been translated; Set of ENs for buildings!



Current state of Eurocodes in Serbia

- Institute for standardization of Serbia (ISS) and Faculty of Civil Engineering - University of Belgrade (FCE-UB) translated 17 parts of Eurocodes. Thirteen of them have been adopted as serbian standards - SRPS EN. Four of them are in the different phases of development.
- ISS published 37 parts of Eurocodes in English language.
- ISS adopted and published (in Official Gazette) 50 parts of eurocodes (of 58).
- ISS published 24 National Annexes, 5 are in final phase (SRPS EN1999/NA) and 4 National Annexes are in the phase of development.
- National regulation for implementation of Eurocode for metal structures (EC3, EC4 and EC9) is planned to be adopted. It should be finished in the first half of 2014.

Eurocodes published in Serbian language

SRPS EN 1990: Basis of structural design

SRPS EN 1991: Actions on structures

- Part 1-1: General actions - Densities, self-weight, imposed loads for buildings
- Part 1-3: General actions - Snow loads
- Part 1-4: General actions - Wind actions
- Part 1-5: General actions - Thermal actions

SRPS EN 1993: Design of steel structures

- Part 1-1: General rules and rules for buildings
- Part 1-3: General rules - Supplementary rules for cold-formed members and sheeting
- Part 1-5: Plated structural elements
- Part 1-8: Design of joints
- Part 1-10: Material toughness and through-thickness properties

SRPS EN 1994: Design of composite steel and concrete structures

- Part 1-1: General rules and rules for buildings

SRPS EN 1995: Design of timber structures

- Part 1-1: General - Common rules and rules for buildings

SRPS EN 1996: Design of masonry structures

- Part 1-1: General rules for reinforced and unreinforced masonry structures

Eurocodes published in English

SRPS EN 1991: Actions on structures
- Part 1-2; Part 1-6; Part 1-7; Part 2; Part 3; Part 4

SRPS EN 1993: Design of steel structures
- Part 1-2; Part 1-4; Part 1-6; Part 1-7; Part 1-9; Part 1-11; Part 1-12;
- Part 2
- Part 3-1; Part 3-2
- Part 4-1; Part 4-2; Part 4-3
- Part 5
- Part 6

SRPS EN 1994: Design of composite steel and concrete structures
- Part 1-2; Part 2

SRPS EN 1995: Design of timber structures
- Part 1-1; Part 1-2
- Part 2

SRPS EN 1996: Design of masonry structures
- Part 1-1; Part 1-2
- Part 2
- Part 3

SRPS EN 1997: Geotechnical design
- Part 2 (draft phase)

SRPS EN 1998: Design of structures for earthquake resistance
- Part 2; Part 4; Part 5; Part 6

SRPS EN 1999: Design of aluminium structures
- Part 1-1; Part 1-2; Part 1-3; Part 1-4; Part 1-5

Adopted and published National Annexes

Basis of structural design EC0
- SRPS EN 1990/NA:2012

Design of steel structures EC3
- SRPS EN 1993-1-1/NA:2013
- SRPS EN 1993-1-2/NA:2013
- SRPS EN 1993-1-3/NA:2013
- SRPS EN 1993-1-4/NA:2013
- SRPS EN 1993-1-5/NA:2013
- SRPS EN 1993-1-6/NA:2013
- SRPS EN 1993-1-7/NA:2013
- SRPS EN 1993-1-8/NA:2013
- SRPS EN 1993-1-9/NA:2013
- SRPS EN 1993-1-10/NA:2013
- SRPS EN 1993-1-11/NA:2013
- SRPS EN 1993-1-12/NA:2013
- SRPS EN 1993-2/NA:2013
- SRPS EN 1993-3-1/NA:2013
- SRPS EN 1993-3-2/NA:2013
- SRPS EN 1993-4-1/NA:2013
- SRPS EN 1993-4-2/NA:2013
- SRPS EN 1993-4-3/NA:2013
- SRPS EN 1993-5/NA:2013
- SRPS EN 1993-6/NA:2013

Design of composite structures EC4
- SRPS EN 1994-1-1/NA:2013
- SRPS EN 1994-1-2/NA:2013
- SRPS EN 1994-2/NA:2013 (draft phase)

СРПСКИ
СТАНДАРД

SRPS EN 1990/NA
2012.

Еврокод – Основе пројектовања конструкција - Национални прилог

Eurocode - Basis of structural design - National Annex

1 издање

ИНСТИТУТ ЗА СТАНДАРДИЗАЦИЈУ СРБИЈЕ

Референтна ознака
SRPS EN1990/NA:2012(en)

Example of National Annex – Form of the front page

2 Национално одређени параметри

2.1 Примена на зграде

2.1.1 Тачка A1.1(1)

Прорачунски експлоатациони век грађевинских конструкција наведен је у табели 2.1.

Табела 2.1 Прорачунски експлоатациони век

Категорија прорачунског експлоатационог века	Индикативни прорачунски експлоатациони век (година)	Примери
1	10	Привремене конструкције[1)]
2	10 до 25	Замењиви делови конструкције, на пример кранси носачи, секундарни носачи код аквадукта, лежишта, дилатациони уређаји, дрвени коловоз код пешачких мостова
3	15 до 30	Пољопривредне и сличне конструкције, висећи пешачки мостови са дрвеним коловозом ширине ≤ 2,0 m.
4	50	Конструкције зграда, конструкције индустријских објеката са веком примене технологије ≤ 50 година и друге једноставне конструкције, мостови за превођење инсталација, пешачке пасареле, мостови на локалним путевима
5	100	Конструкције монументалних зграда, мостови и конструкције инжењерских грађевинских објеката[2)]

[1)] Конструкције или делови конструкција који могу да се демонтирају са изгледима да се поново користе не треба да се разматрају као привремени.

[2)] Прорачунски век трајања за инжењерске грађевинске објекте у оквиру прилаза индустријским комплексима дефинише се за сваки појединачни пројект.

Ближа класификација објеката у односу на категорију прорачунског експлоатационог века

Објекти категорије 4

1. Објекти за прераду нафте и гаса, међународни и магистрални продуктоводи, гасоводи и нафтоводи за транспорт, гасоводи називног радног натпритиска преко 16 bar, уколико прелазе најмање две општине, складишта нафте, гаса и нафтних деривата капацитета преко 500 t, магистрални и регионални топлодалеководи, објекти за производњу биодизела.
2. Објекти базне и прерађивачке хемијске индустрије, црне и обојене металургије, објекти за прераду коже крзна, објекти за прераду каучука, објекти за производњу целулозе и папира и објекти за прераду неметалних минералних сировина, осим објеката за примарну прераду украсног и другог камена, у склад са капацитетима дефинисаним у Уредби о утврђивању листе пројеката за које је обавезна процена утица и листе пројеката за које се може захтевати процена утицаја на животну средину.
3. Стадиони за 10 000 и више гледалаца, објекти конструктивног распона 50m и више, објекти висине 50m више, силоси капацитета преко 10 000m³, објекти казнено-поправних установа.
4. Термоелектране снаге 10 MW и више, термоелектране-топлане електричне снаге 10 MW и више и далеководи и трафостанице напона 110 kV и више.
5. Међурегионални и регионални објекти за водоснабдевање и канализацију, постројења за припрему воде пиће капацитета преко 40 l/s и постројења за пречишћавање отпадних вода у насељима преко 15 000 становника или капацитета 40 l/s.

Example of National Annex – NDPs

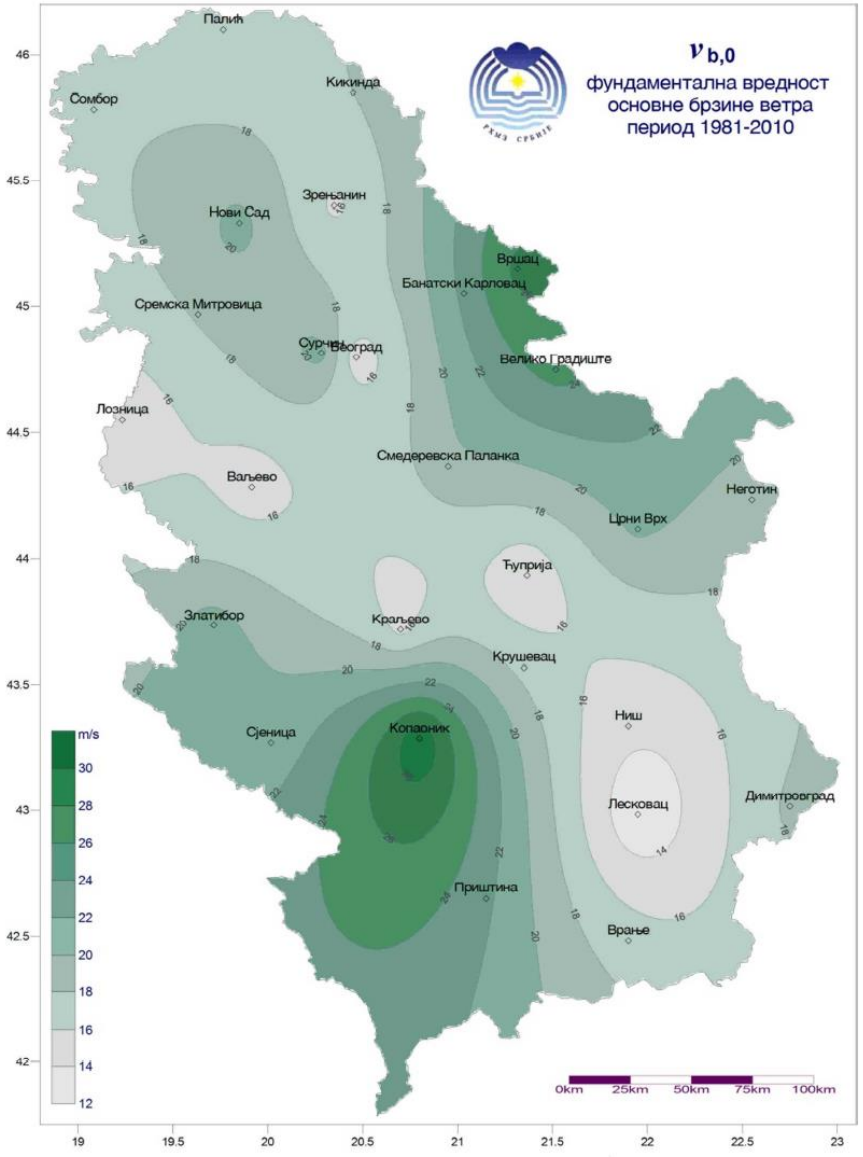
National Annexes - NA for metal structures

- All of 20 National Annexes for steel structures (SRPS EN 1993) have been published in Official Gazette!
- All NA for composite steel-concrete structures (SRPS EN 1994), also have been finnished!
- All NA for Aluminium structures (SRPS EN 1999) have been prepared and should be adopted and published in next month.
- Generaly, recommanded values of partial factors for resistance have been adopted!
- National choice of calculation methods have been made.
- Additional information (Procedure for calculation of critical moment for LT- buckling, Design criteria for rigid (block) shear connectors.
- Corrections of some errors have been indicated in footnotes in SRPS EN.

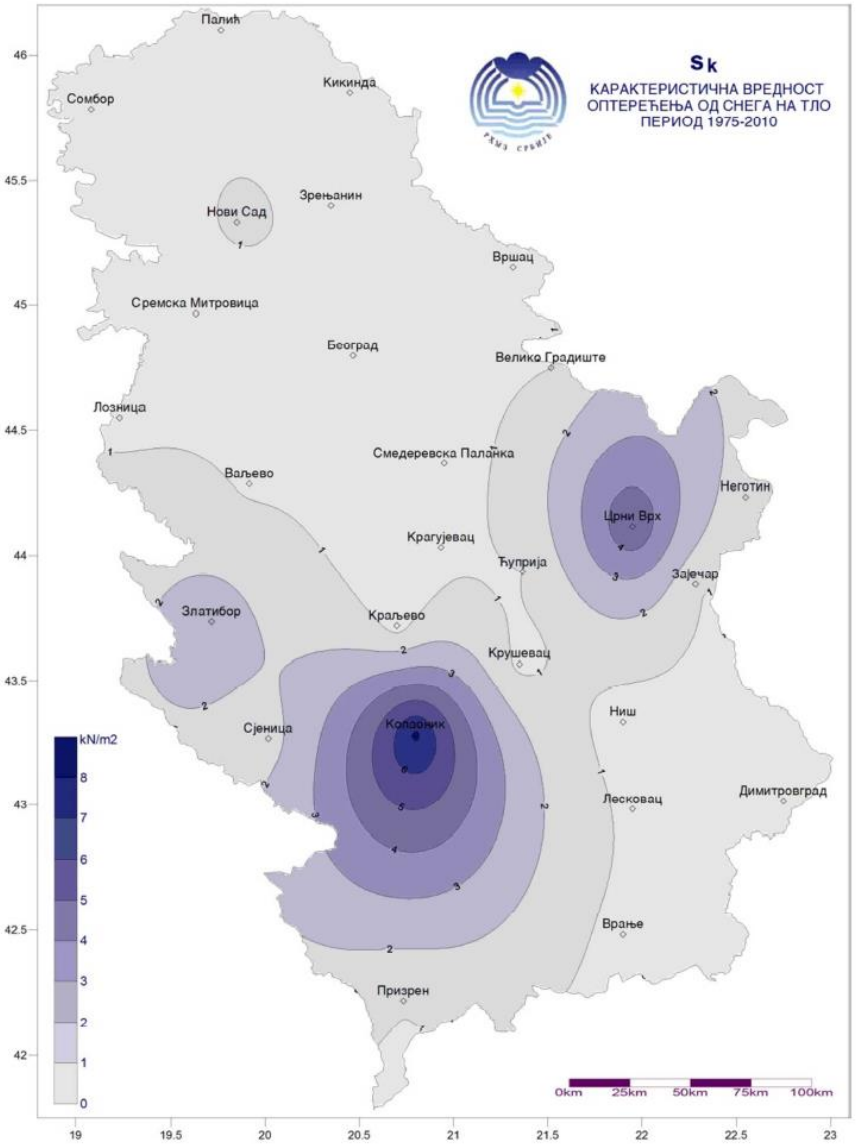
National Annexes for actions on structures

- None of National Annexes for actions on structures has been adopted yet!
- NA for snow loads, wind actions and thermal actions are currently in phase of preparation. Works in progres!
- Main problems are National maps for snow load, wind speed and temperature (min/max)!
- First draft of NA for wind actions (SRPS EN1991-1-4/NA) has been finished! (Even 65 clause with NDPs). Also, huge differences in National Annexes of most important european countries (BS, DIN, NF,...).

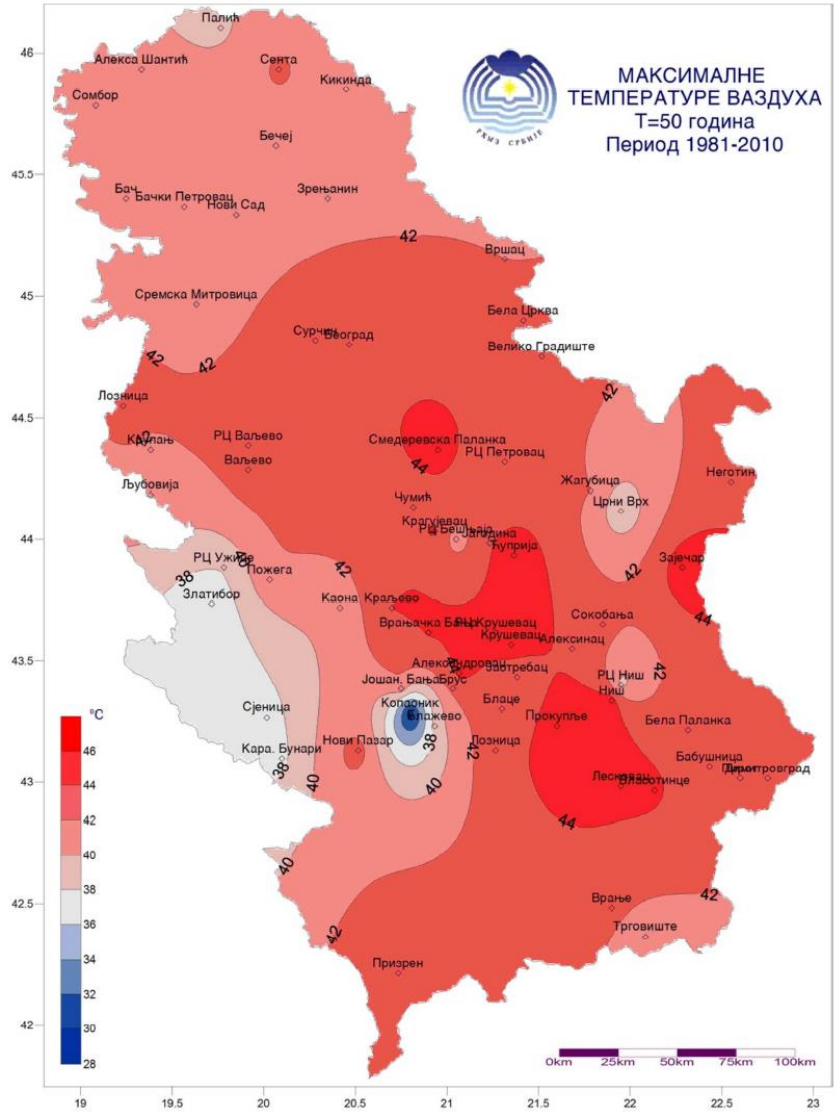
Map of wind speed
(without influence of altitude)

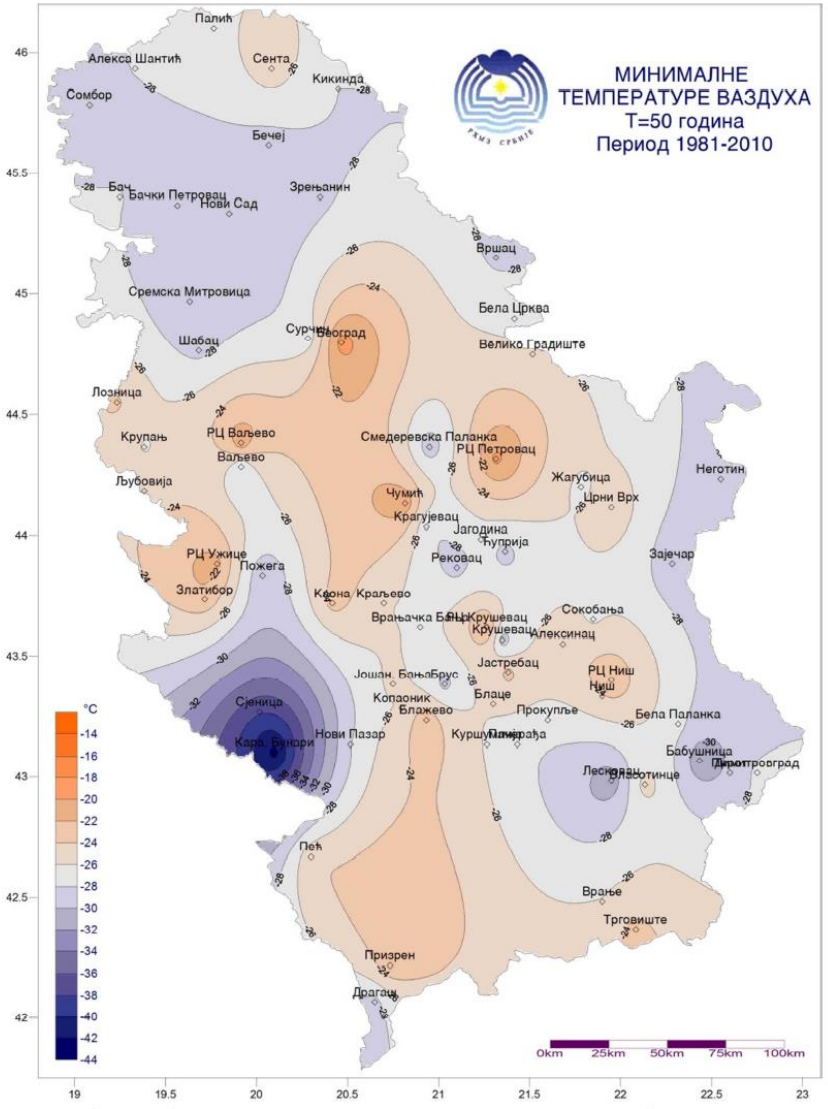


Snow loads
(without influence of altitude)



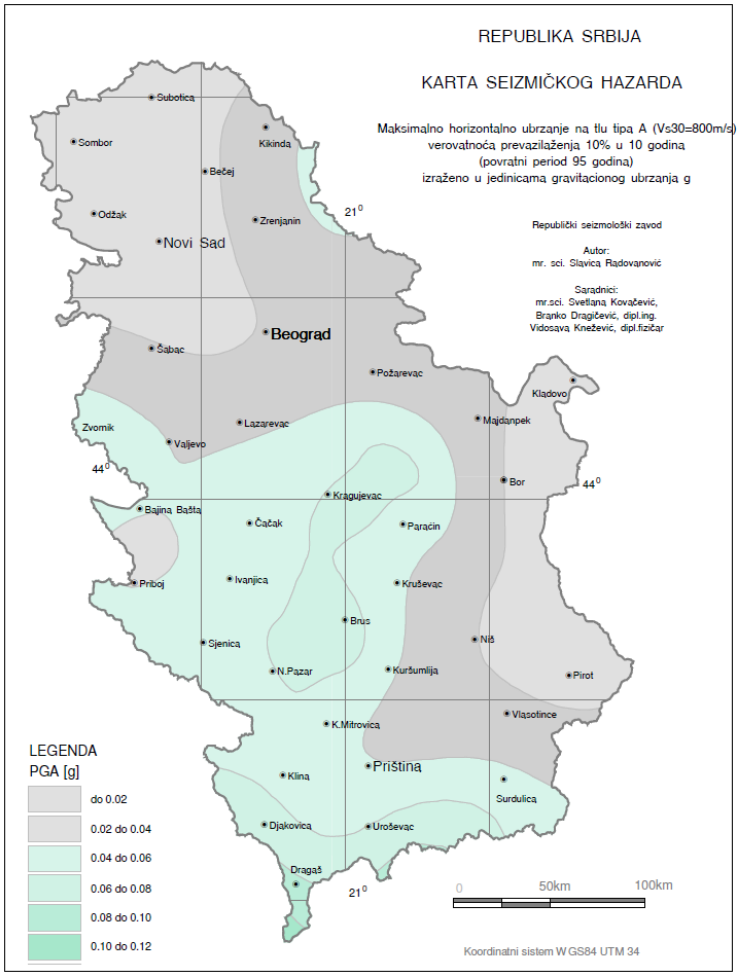
Maps of temperatures (max/min)



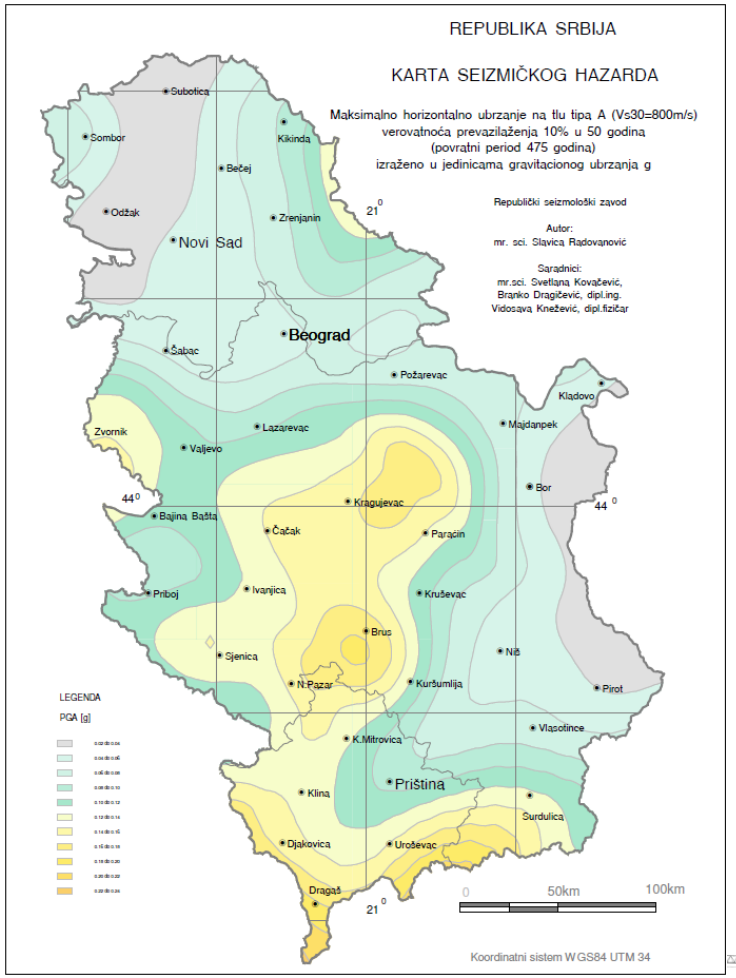


Seismic Hazard Maps
Peak Ground Acceleration – Ground Type A

95 year return period



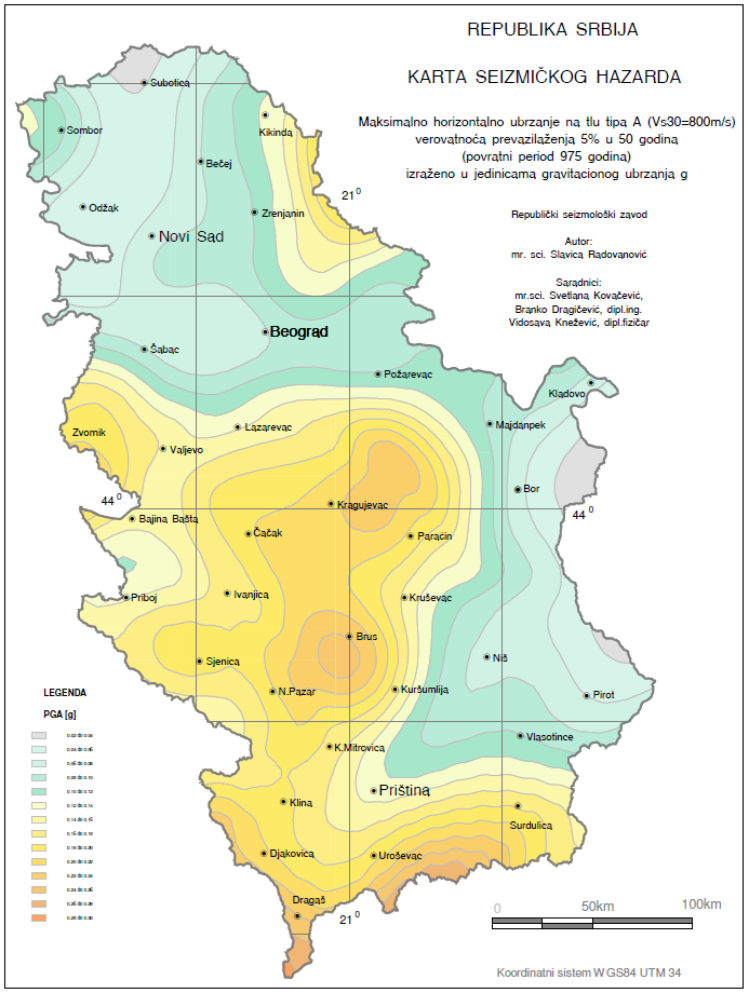
475 year return period



Seismic Hazard Maps

Peak Ground Acceleration – Ground Type A

975 year return period



Next steps

- Adoption and publication of remaining parts of Eurocodes!
- Preparation and publication of Technical regulations for implementation of all Eurocodes (for all kinds of structures and for actions).
- Preparation and organisation of training courses - workshops for permanent education of engineers.
- Preparation and publication of appropriate literature.
- Translation and publication of new set of eurocodes (e.g. for bridges and for fire resistance).
- Publication of translated reference standards (e.g. EN 1090).
- Promotion and implementation of eurocodes in practice.

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Thank you for your attention!