

"The way forward for the Eurocodes implementation in the Balkans"

10-11 October 2018, Tirana

Country report: The Republic of Moldova

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**Affiliation: European neighboring countries
of Eastern Europe**

The Republic of Moldova

- ✓ located in Eastern Europe, bordered on the west and southwest by Romania and on the north, south, and east by Ukraine
- ✓ population - 4,038,575 people, density of population – 123 per km², the total land area - 32,850 Km²
- ✓ main cities are the capital Chisinau, in the center of the country, Tiraspol (in the eastern region of Transnistria), Bălți (in the north) and Bender (in the south-east)
- ✓ the climate is moderately continental, its proximity to the Black Sea leads to the climate being mildly cold in the autumn and winter and relatively cool in the spring and summer



The Republic of Moldova

- ✓ average elevation of around 147 m above the sea level
- ✓ maximum altitude of 429.5 m
- ✓ north with maximum altitude of 320 m
- ✓ south with maximum altitude of 250 m
- ✓ average summer temperature : $25 \div 32^{\circ}\text{C}$
- ✓ rainfall: 620 mm in the north to 490 mm in the south



Legal/policy framework for adoption of the Eurocodes

- ✓ **Law # 112/2014 (ratification of the Association Agreement Moldova – UE, art. 173 (5):**
 - progressively transposition of the corpus of European Standards (EN) as national standards
 - simultaneously with such transposition, withdraw conflicting national standards

- ✓ **Gov. Decision # 933/2014 Action plan for Gov. 2014-2020 (implementation of Eurocodes), art. 3 :**
 - harmonization of national normative documents in the field of construction with European standards
 - withdrawal of conflicting national standard identical with European standards

Institutional framework

- ✓ **Ministry of Economy and Infrastructure (technical regulation of construction)**
- ✓ **INCERCOM – State Scientific and Research Institute in Construction (development of technical regulations, technical agreements, testing, certification of construction products, research)**
- ✓ **URBANPROIECT – State Design and Research Institute (development of technical regulations, design of constructions, development of city plans)**
- ✓ **Institute of Geography and Ecology – climate maps**
- ✓ **Institute of Geology and Seismology – seismic maps**
- ✓ **Institute for Standardization of Moldova (development and adoption of standards)**

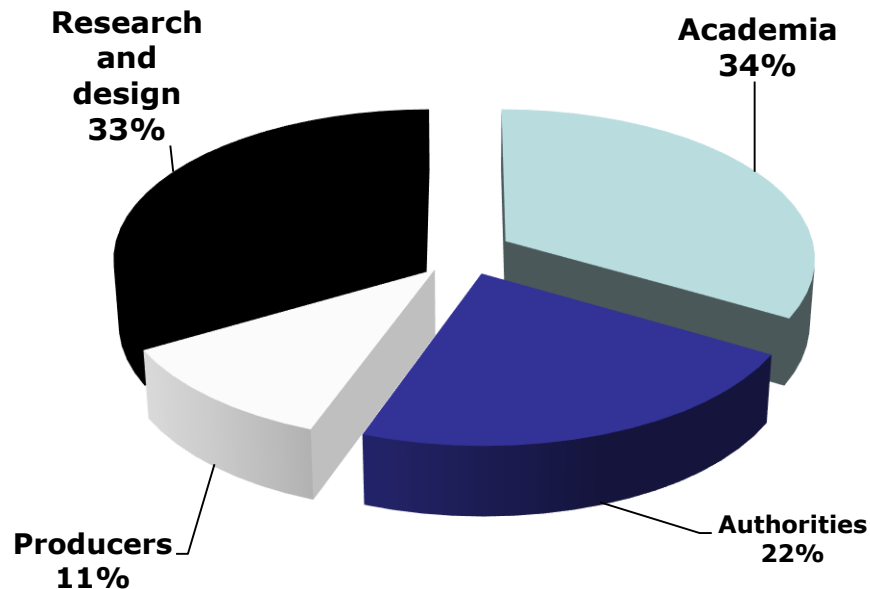
ISM – National Standards Body (NSB) of Moldova

- ✓ **public institution founded by the Ministry of Economy and Infrastructure**
- ✓ **development and adoption of standards**
- ✓ **29 staff**
11 staff Standardization Department
- ✓ **25 National Technical Committees (NTC)**
3 NTC in construction field (TC 49 Energy efficiency of buildings, TC 51 Construction materials and articles, TC 54 Eurocodes)



TC 54 Eurocodes

- ✓ established in 2016
- ✓ 9 TC members
- ✓ development of the national annexes to Eurocodes



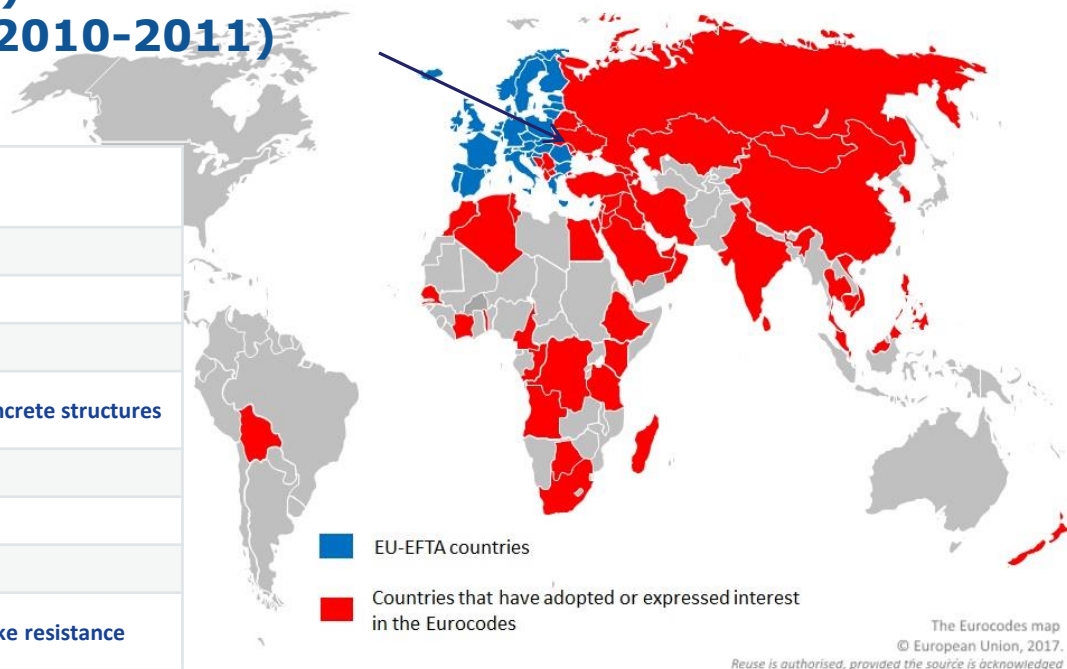
Technical regulations and standards in construction ≡ Eurocodes

Eurocod	Title Eurocod	Analogical Moldovan norm	Title
EN 1990	Basis of structural design	GOST 27751- 88(witdrawn)	Reliability of structures and bases. Principal rules of the calculations.
EN 1991	Actions on structures	SNiP 2.01.07-85*	Loads and actions
EN 1992	Design of concrete structures	NCM F.02.02-2006	Concrete and reinforced concrete structures. Calculation, designing and methods of production of elements from reinforced and prestressed concrete
EN 1993	Design of steel structures	SNiP II-23-81*	Steel structures
EN 1994	Design of composite steel and concrete structures	–	–
EN 1995	Design of timber structures	NCM F.05.01-2007	Wood structures. Designing timber constructions
EN 1996	Design of masonry structures	NCM F.03.02-2005	Masonry structures. Design of buildings with masonry walls
EN 1997	Geotechnical design	SNiP 2.02.01-83*, SNiP 2.02.03-85	Bases of structures. Pile foundations
EN 1998	Design of structures for earthquake resistance	SNiP II-7-81*	Construction in Seismic Areas
EN 1999	Design of aluminium structures	SNiP 2.03.06-85	Aluminium structures

Eurocodes adoption

10 standards (EN 1990 – 1999)
58 Eurocodes parts adopted (2010-2011)
as national

SM EN 1990	Eurocode 0: Basis of structural design
SM EN 1991	Eurocode 1: Actions on structures
SM EN 1992	Eurocode 2: Design of concrete structures
SM EN 1993	Eurocode 3: Design of steel structures
SM EN 1994	Eurocode 4: Design of composite steel and concrete structures
SM EN 1995	Eurocode 5: Design of timber structures
SM EN 1996	Eurocode 6: Design of masonry structures
SM EN 1997	Eurocode 7: Geotechnical design
SM EN 1998	Eurocode 8: Design of structures for earthquake resistance
SM EN 1999	Eurocode 9: Design of aluminum structures



Eurocodes translation

- ✓ **100 % of Eurocodes translated in Romanian language**
- ✓ **ISM received Romanian translations of all Eurocodes from the Romanian Standards Association (signed Agreement with ASRO)**



DEVELOPING NATIONAL ANNEXES

- ✓ **15 National Annexes for Eurocode 0, 1, 2 developed and published**
- ✓ **NDPs defined for Eurocode 3, 4, 5**



TECHNICAL UNIVERSITY OF
CIVIL ENGINEERING BUCHAREST

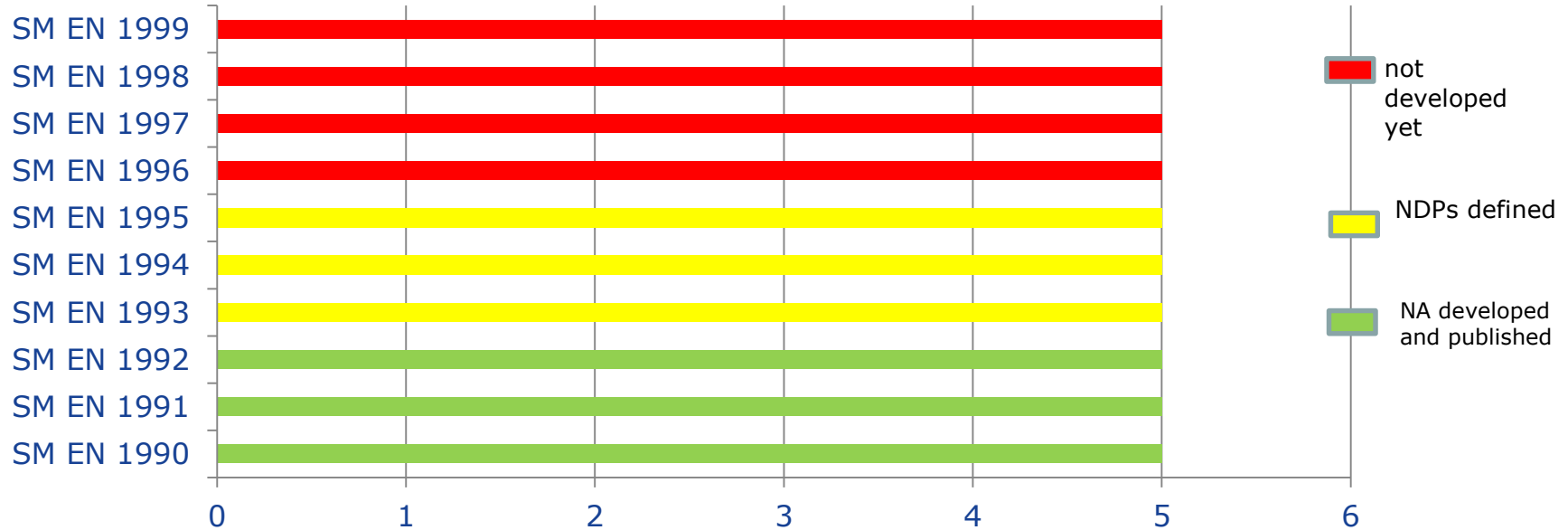


CZECH OFFICE FOR STANDARDS, METROLOGY AND TESTING



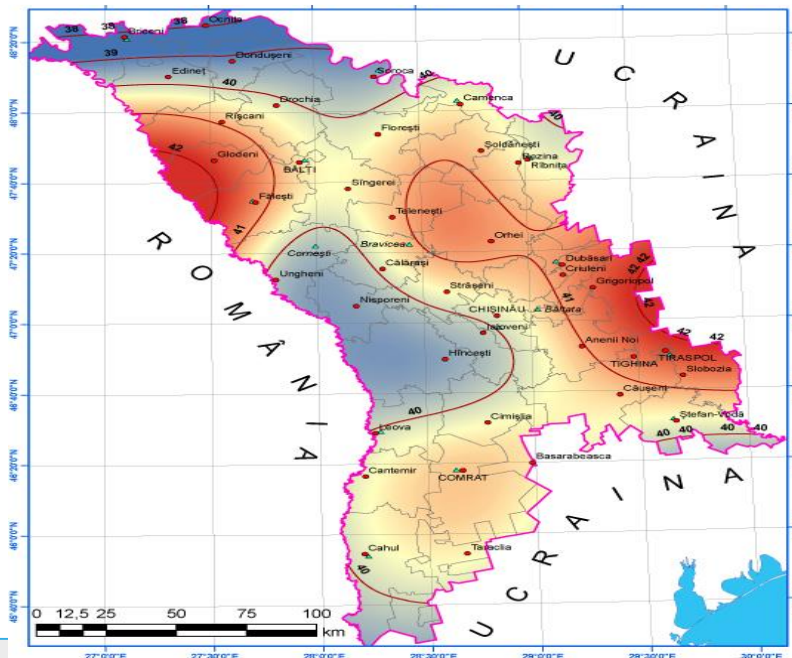
CZECH REPUBLIC
DEVELOPMENT COOPERATION

National Annexes and harmonization

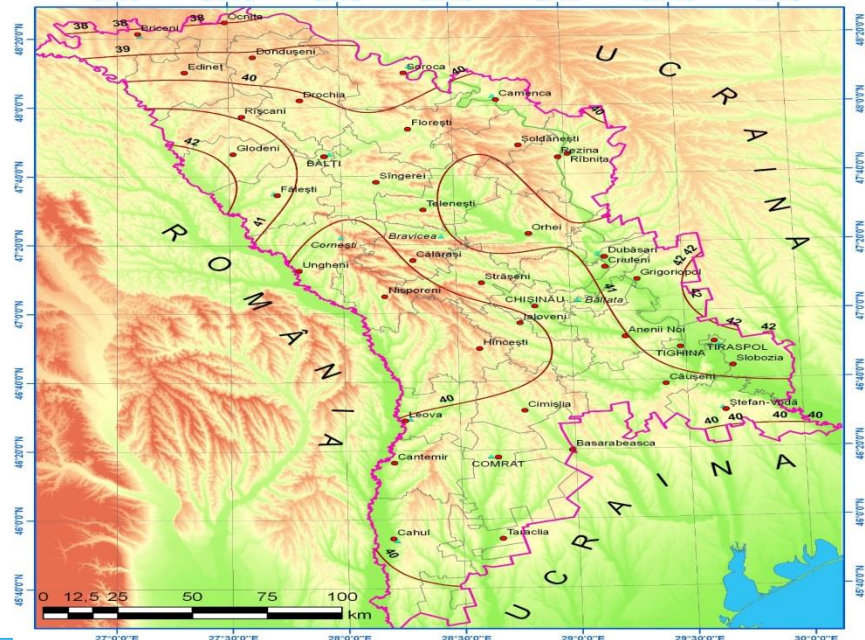


Air temperature maximum (in shadow)-50 years

Isothermal map of the Republic of Moldova for the characteristic values of the maximum annual temperatures

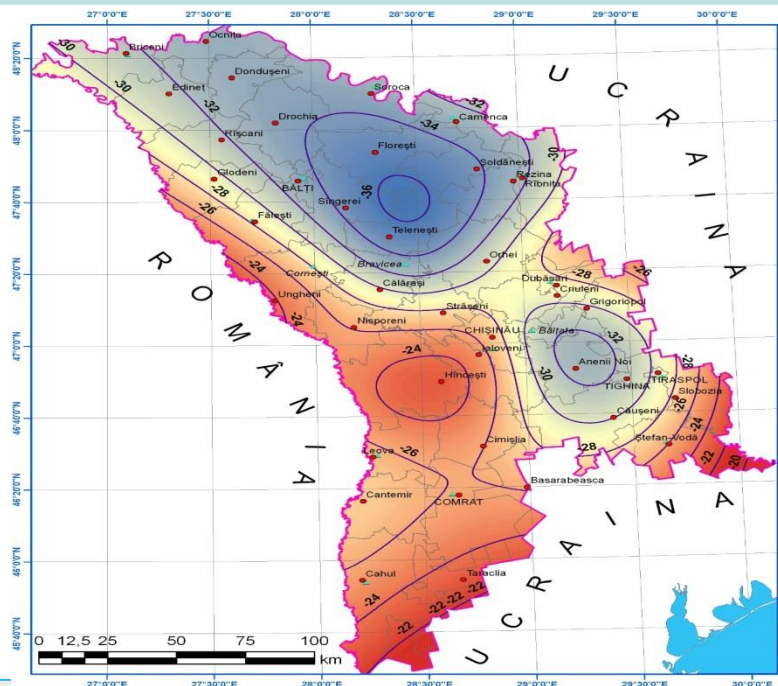


Isothermal map of the Republic of Moldova for the characteristic values of the maximum annual temperatures

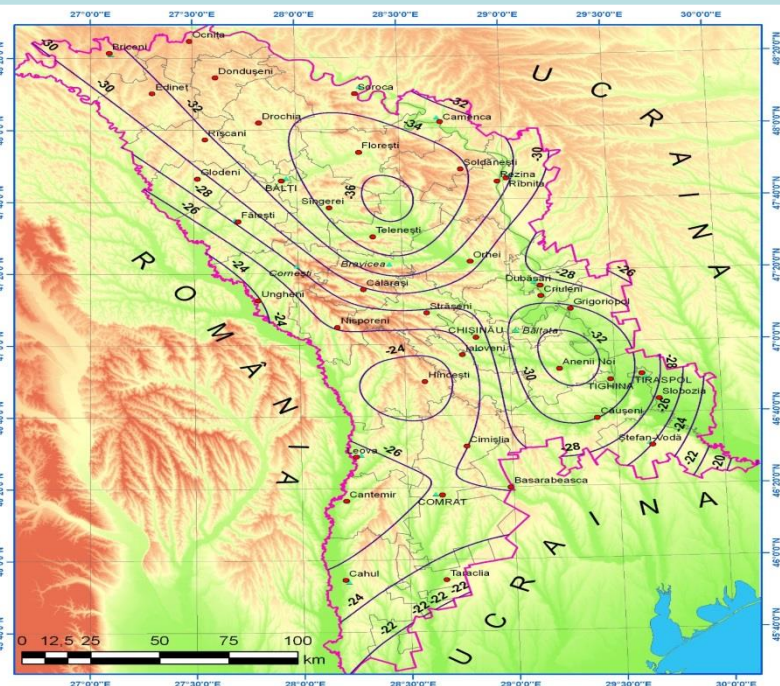


Air temperature minimum (in shadow)-50 years

Isothermal map of the Republic of Moldova for the characteristic values of the minimum annual temperatures

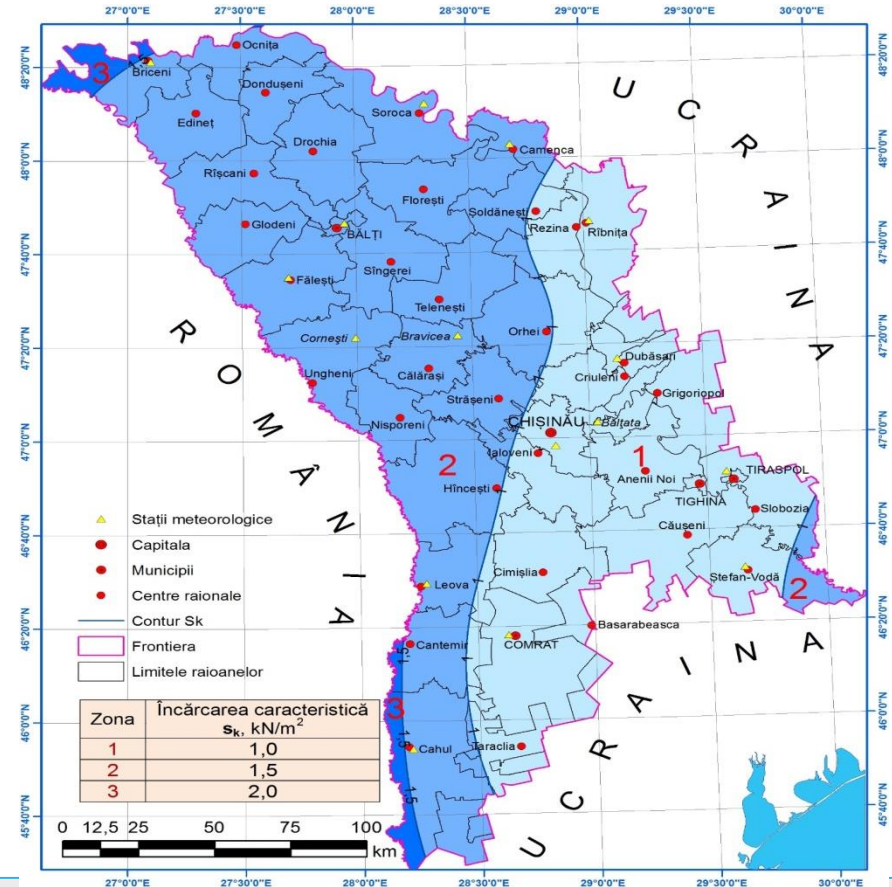


Isothermal map of the Republic of Moldova for the characteristic values of the minimum annual temperatures



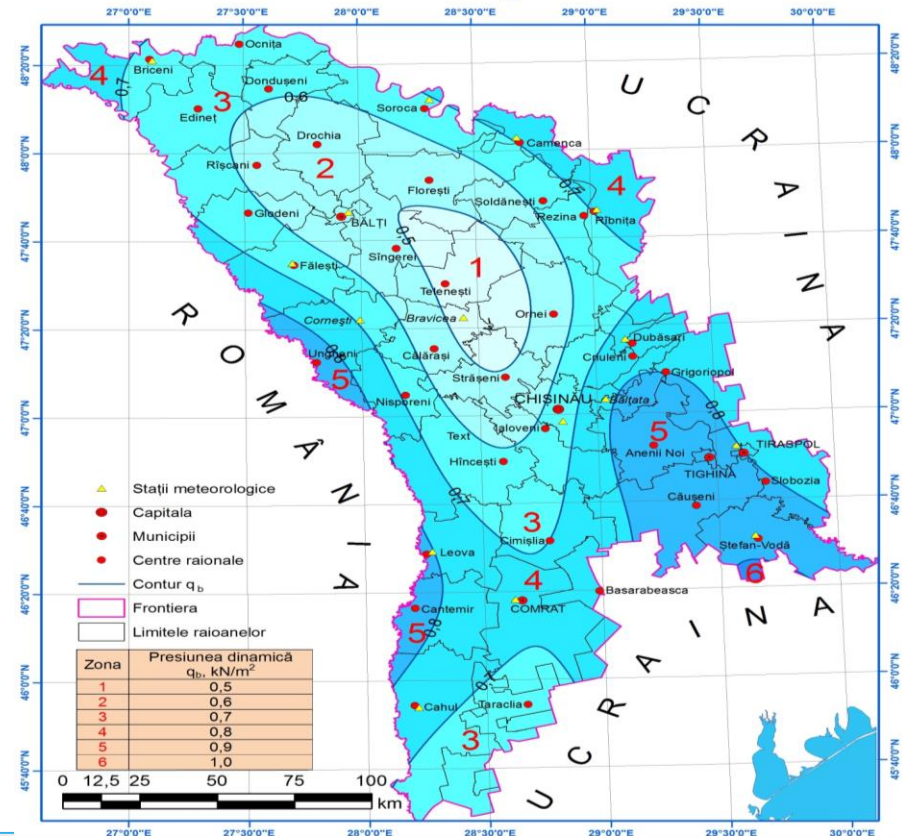
Snow loads map

Zoning of Moldova's territory in terms of characteristic values of snow loads on the ground, S_k , kN/m², 50 years

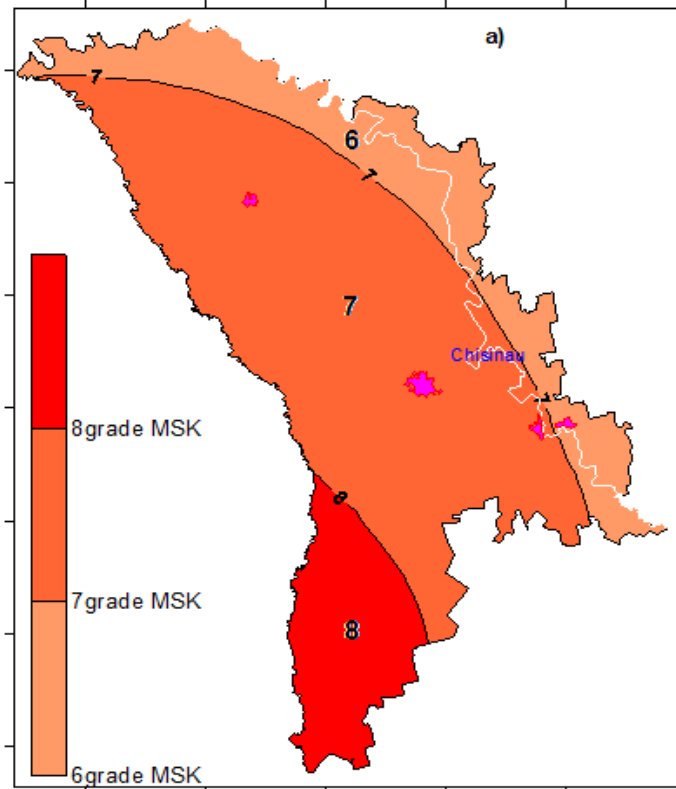


Wind map

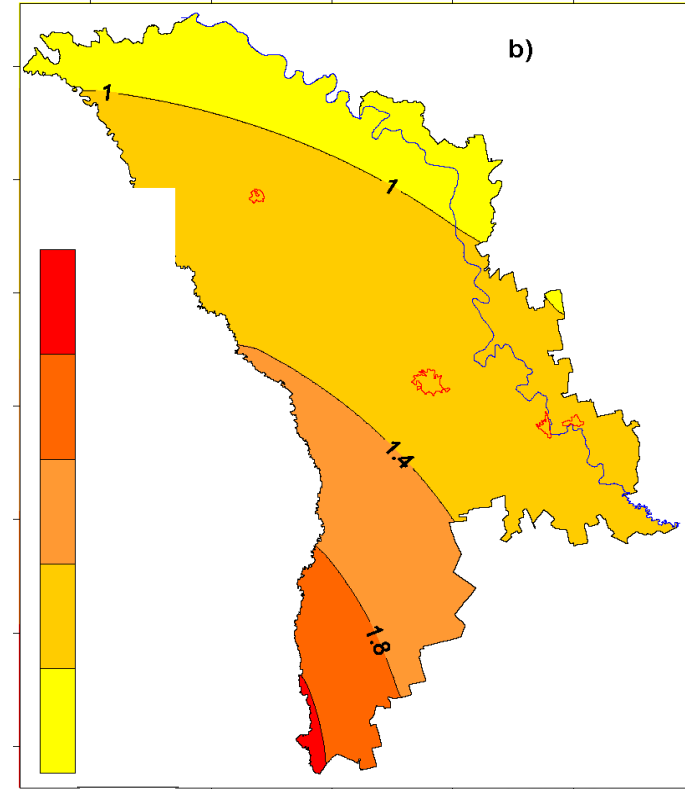
Zoning of Moldova's territory in terms of reference values of dynamic wind pressure, q_b , in kPa, 50 years



Seismic zones – 6, 7, 8 grades



a) in terms of MSK



b) in terms of Eurocode 8

SEISMIC ZONE VRANCEA, Romania



- ✓ the earthquakes reach a depth of about 180 km
- ✓ maximal magnitude achieves 7.5-7.8 (max) on Richter's scale
- ✓ the maximal seismic intensity is evaluated at the level of 8-9 degrees according to the 12-degree scale

EUROCODES IMPLEMENTATION. FUTURE...

Eurocode 6: Design of masonry structures

Eurocode 7: Geotechnical design

**Eurocode 8: Design of structures for
earthquake resistance**

Eurocode 9: Design of aluminum structures





Eurocodes implementation. Challenges

- **Insufficient capacities (specialists, financial, technical)**
- **Inadequate legislative framework for EN standards implementation (SNiP, NCM \equiv Eurocode, SNiP and NCM – mandatory, prescriptive; EN standards – voluntary, mainly performance based)**
- **Resistance from professionals (high degree of conservatism)**

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Thank you for your attention!

Useful links:

***Ministry of Economy and Infrastructure
(www.mei.gov.md)***

***Institute for Standardization of Moldova
(www.standard.md)***

