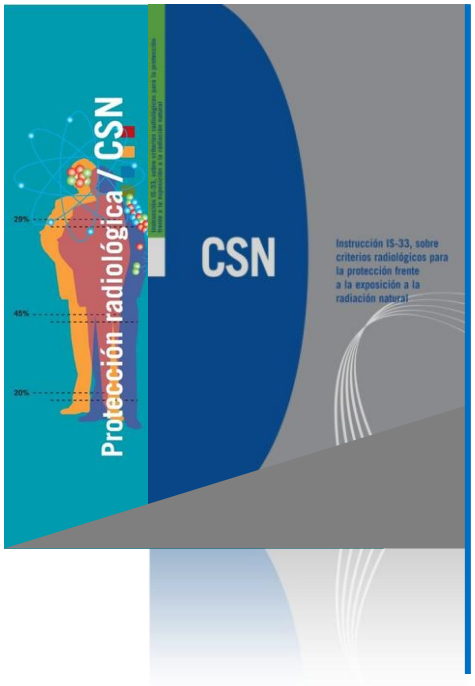
Radon Regulation in Spain

Marta García-Talavera (CSN)

Regulatory Framework



1. National Radon Action Plan

2. Workplace Regulation

3. Building Regulation

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Legislación

57° año

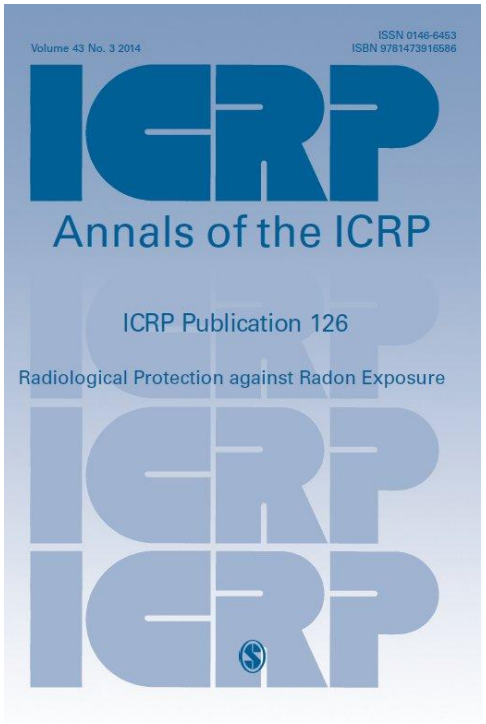
17 de enero de 2014

Sumario

II *Actos no legislativos*

DIRECTIVAS

★ Directiva 2013/59/Euratom del Consejo, de 5 de diciembre de 2013, por la que se establecen normas de seguridad básicas para la protección contra los peligros derivados de la exposición a radiaciones ionizantes, y se derogan las Directivas 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom y 2003/122/Euratom 1



Transposition & Implementation: Assignment of responsibilities, legal certainty, basic infrastructure, service providing, capacity building, regulatory enforcement, NRA's human resources, public information, etc.

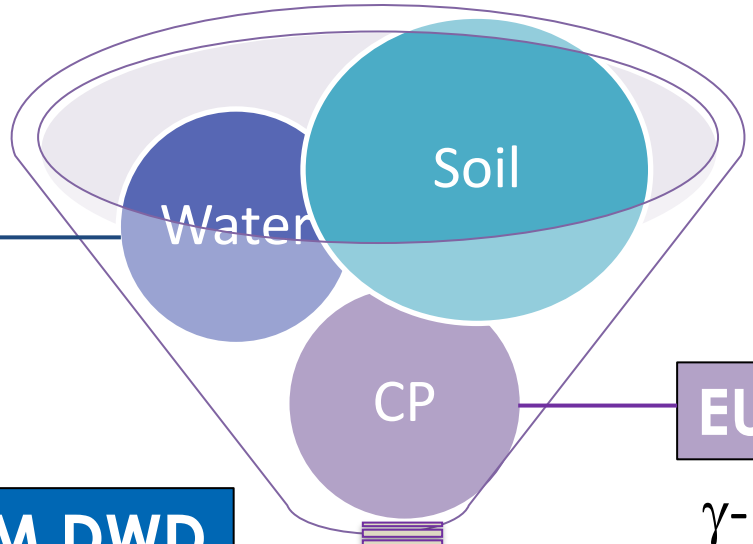
CSN CONSEJO DE SEGURIDAD NUCLEAR

National Radon Action Plan

Directive 2013/59/EURATOM Article 103

1. Radon Action Plan

EU-BSS Article 103: "*… for any source of radon ingress*".



EU-BSS Article 75

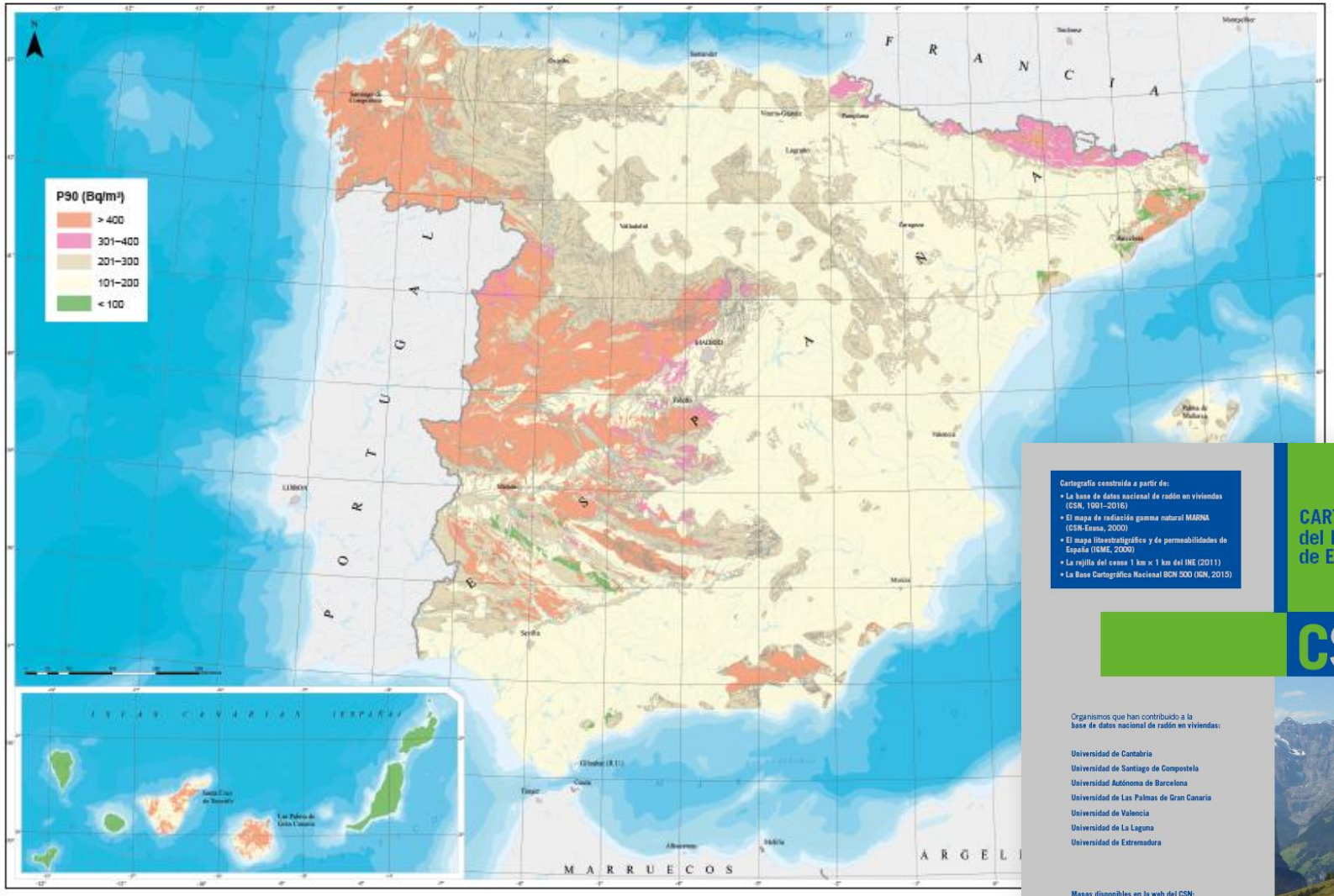
γ-radiation: 1 mSv/y

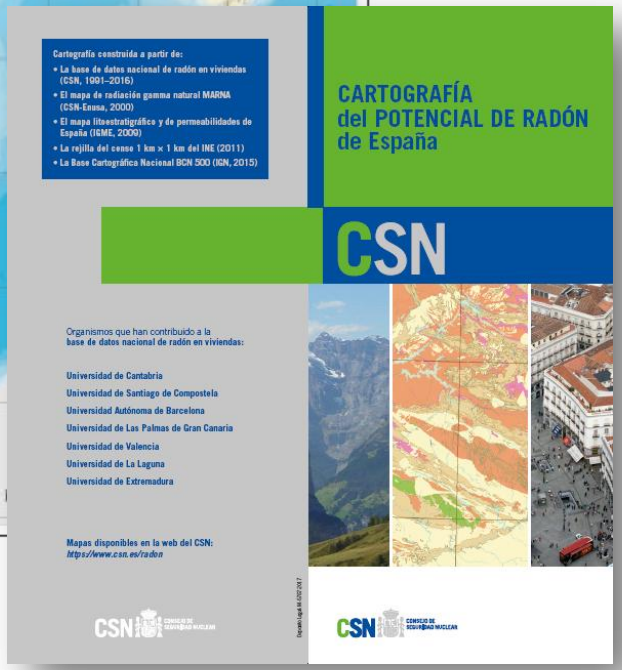
2013/51/EURATOM DWD

Rn parametric value: 100 Bq/l

1. Radon Action Plan

García-Talavera et al. 2013 J. Radiol. Prot. **33** 605





Rn reference level: 300 Bq/m³ (Article 54.1)

1.

Radon Action Plan

CSN CONSEJO DE SEGURIDAD NUCLEAR

Workplace Regulation

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Regulation on Health Protection Against Ionising Radiation (2001)

• Work activities involving increased exposure of workers or the public to **natural ionising radiation**

2. Workplace Regulation

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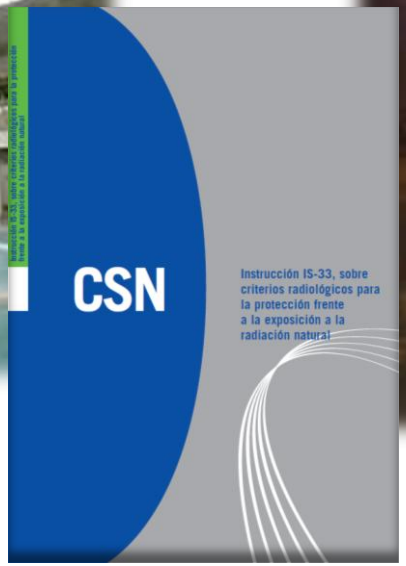
CSN IS-33

1. Underground workplaces (caves, mines…)
2. Workplaces processing or using groundwater
3. Workplaces in RADON PRONE AREAS (**EU-BSS Article 54.2**)



2. Workplace Regulation

New RP Framework Regulation (2019)

- **Notification: > 300 Bq/m^3** **(Article 54.3)**

  - **Workers > 6 mSv/y, Planned exposure situation** **(Article 35.2)**

    (area classification & signage, area and personal dose monitoring, dose limitation, PPE, record keeping and information)

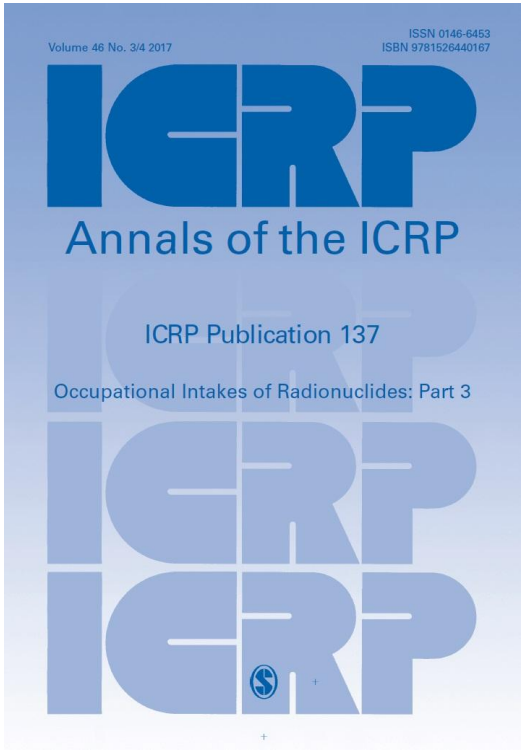
  - **Workers < 6 mSv/y,** Re-test Rn levels every 5 years

2. Workplace Regulation

- **Dose assessment**

For inhaled Rn-222 + progeny:

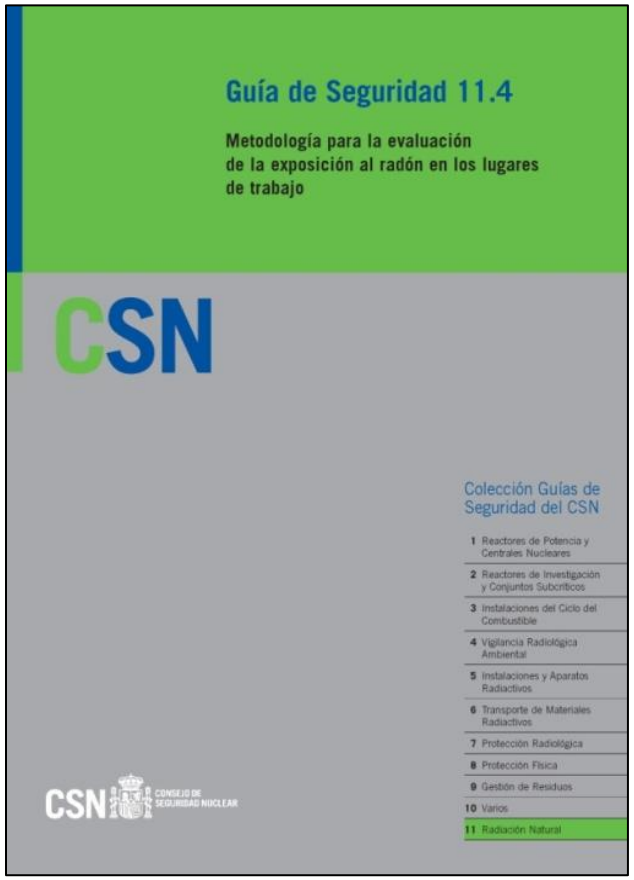
- **3 mSv per mJ h m^{-3}** in most circumstances
- **6 mSv per mJ h m^{-3}** for tourist caves, work involving substantial physical activity



- CSN to release guidance on cases requiring site-specific calculations

2. Workplace Regulation

CSN Safety Guide 11.4



Workplace Regulation

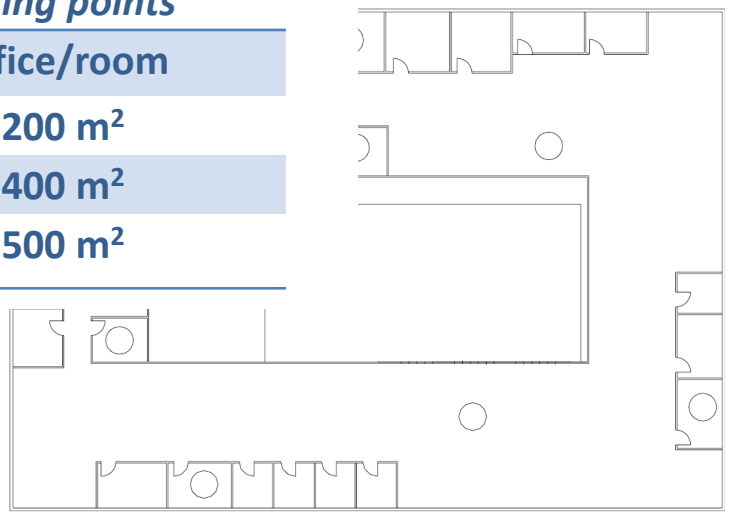
CSN CONSEJO DE SEGURIDAD NUCLEAR

SG 11.4: Spatial sampling design

- ✓ Divide the workplace into **Homogeneous Radon Areas** (e.g.: individual rooms; HVAC zones. Consider: temperature gradients; room usage, fixed work areas, etc.)
- ✓ Place at least one detector per HRA, with a minimum of 2 detectors per workplace

Total certified area within premises	*Minimum number of sampling points*
Public-use buildings; offices	1 per office/room
< 1000 m^2	1 per 200 m^2
1000-5000 m^2	1 per 400 m^2
> 5000 m^2	1 per 500 m^2

Adapted from RPII



2. Workplace Regulation

SG 11.4: Spatial sampling design

✓ For large spaces classified as HRA with several fixed work areas, perform χ^2 test:

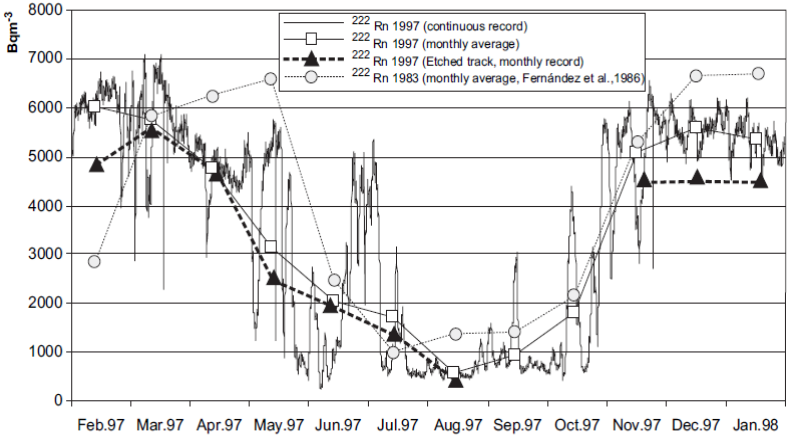
$$\frac{s_{ext}^2}{s_{int}^2} = \chi_R^2$$

- ☑ PASS Assign sample average
- ☑ FAIL For fixed work areas, assign value of closest detector

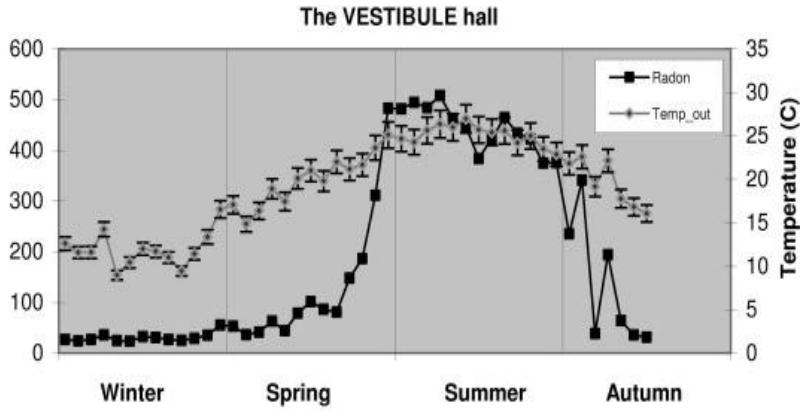
2. Workplace Regulation

SG 11.4: Temporal sampling design: Seasonality

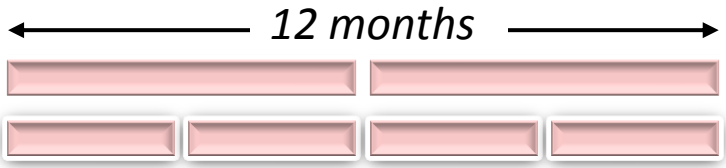
- Underground workplaces: 1 full year (open-season) exposure *



Altamira cave, Spain (Lario et al., 2005)



Nerja cave, Spain (Dueñas et al., 2011)

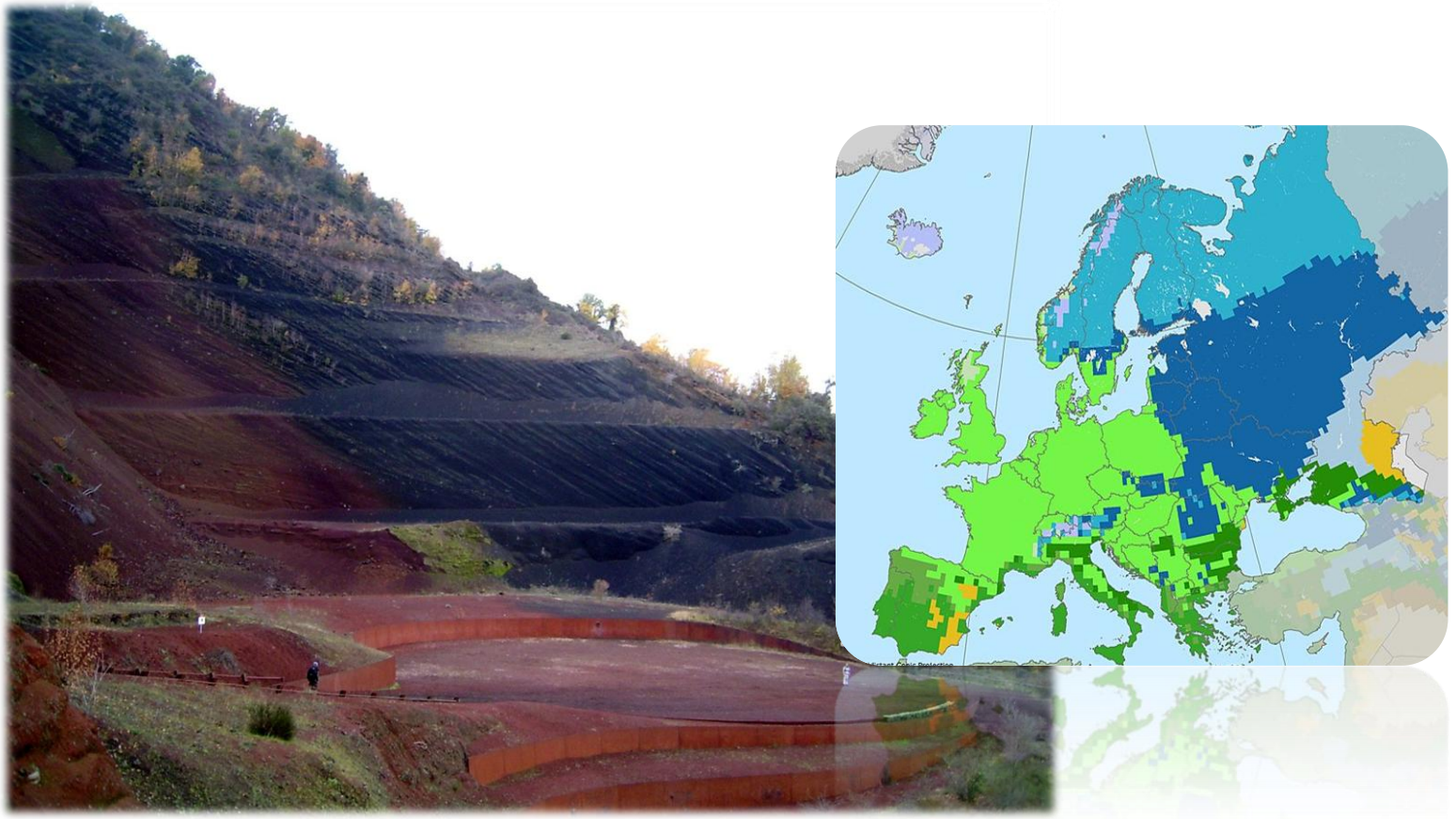


* Take prompt action if 1st 3/6-month measurement results elevated

2. Workplace Regulation

- Other workplaces: > 3 months during the heating season

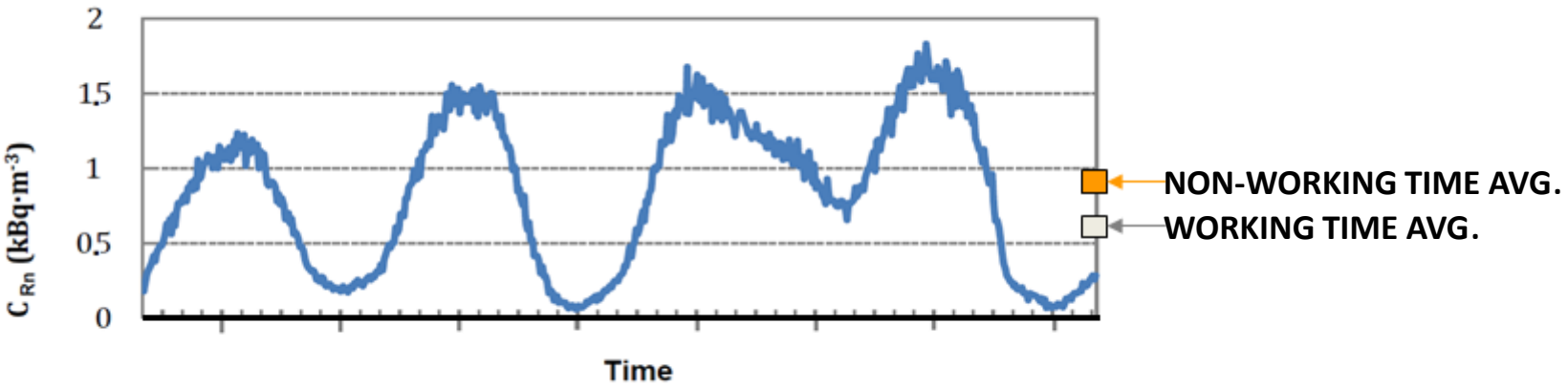
Rn levels usually higher at winter. Yet a non-negligible fraction displays no seasonal pattern or follows the reverse behaviour.



2. Workplace Regulation

SG 11.4: Temporal sampling design. Short term

- Working time *vs.* non-working time concentration (day/night; weekend; holiday)



Ratio of correlated variables: based on at least **5 independent determinations** (day/night: 24 h long ; weekend: 72-h long) over non-consecutive days

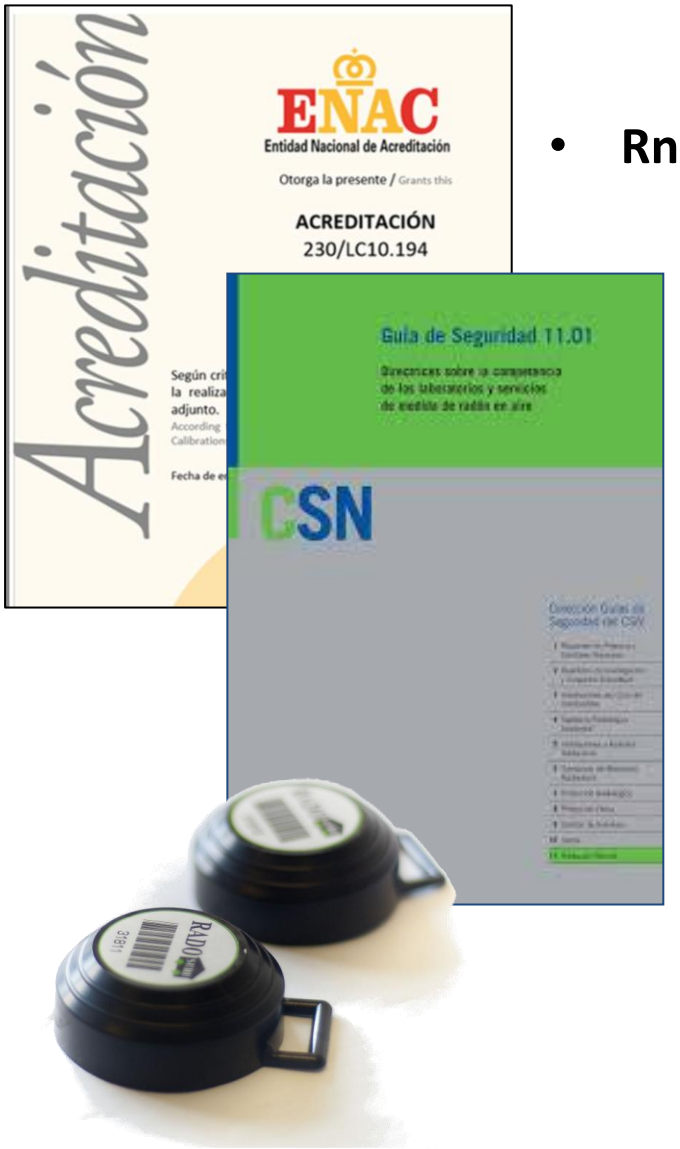
2. Workplace Regulation

EU-BSS Article 54.3: *"…action taken in accordance with the principle of* ***optimisation***"

- Notification must include **Documentary Evidence**

2. Workplace Regulation

Provision of services



- **Rn measurement laboratories:** ISO 17025 accreditation

- **TRPU [RP advice, dose assessment]:**

  (> 300 Bq/m^3): CSN authorisation. Duty to report on compliance breaches)

- **Rn personal dosimetry services:**

  CSN authorisation

3. Building Regulation

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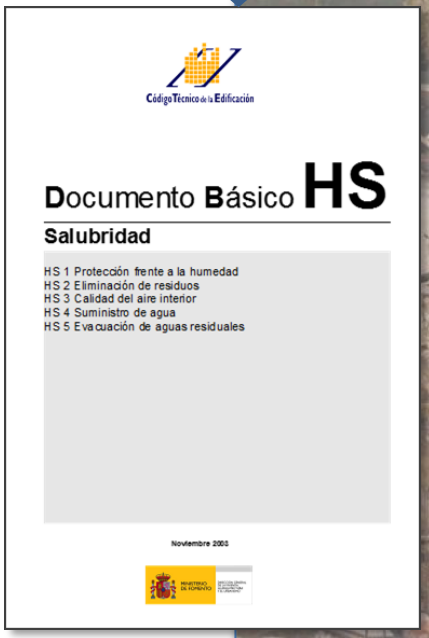
CTE
CÓDIGO TECNICO DE LA EDIFICACIÓN

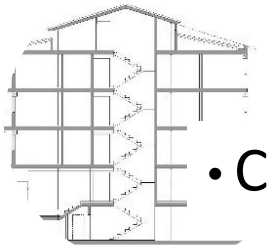


New Section HS6
Protection against radon exposure

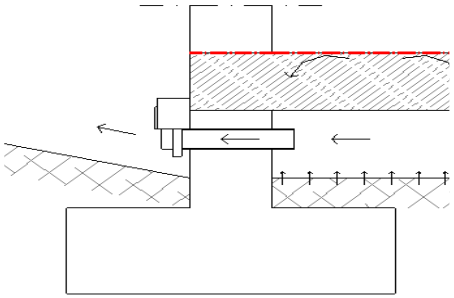
Guidance Documents

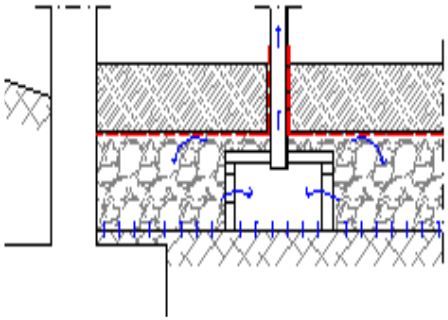
Building Regulation

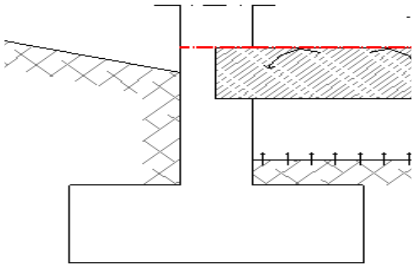
New Buildings



- Classification by municipality







3. Building Regulation

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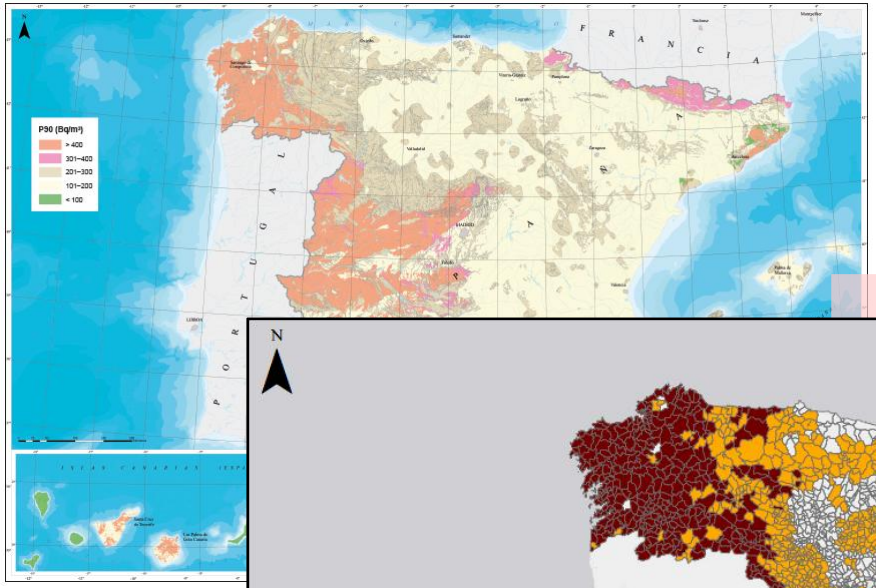
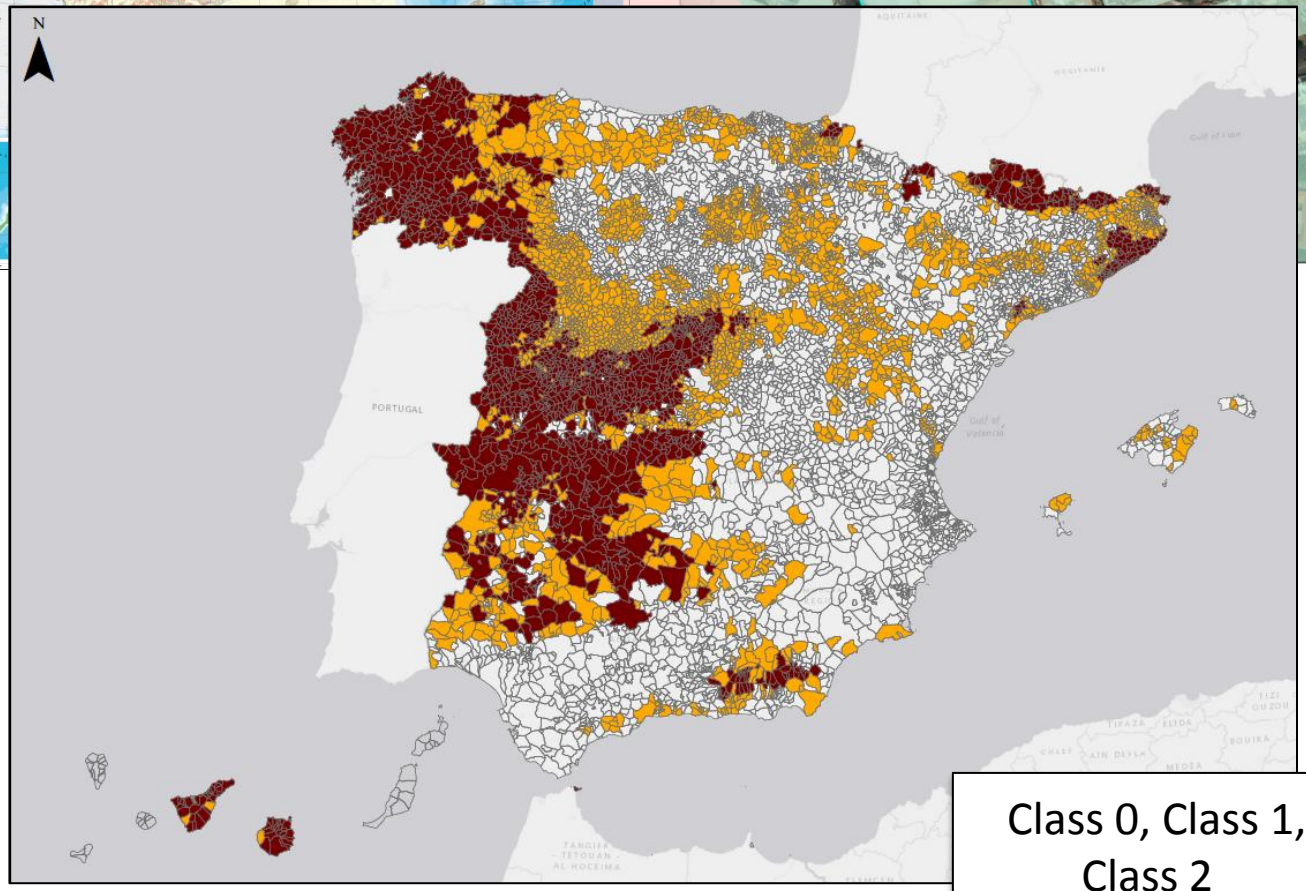




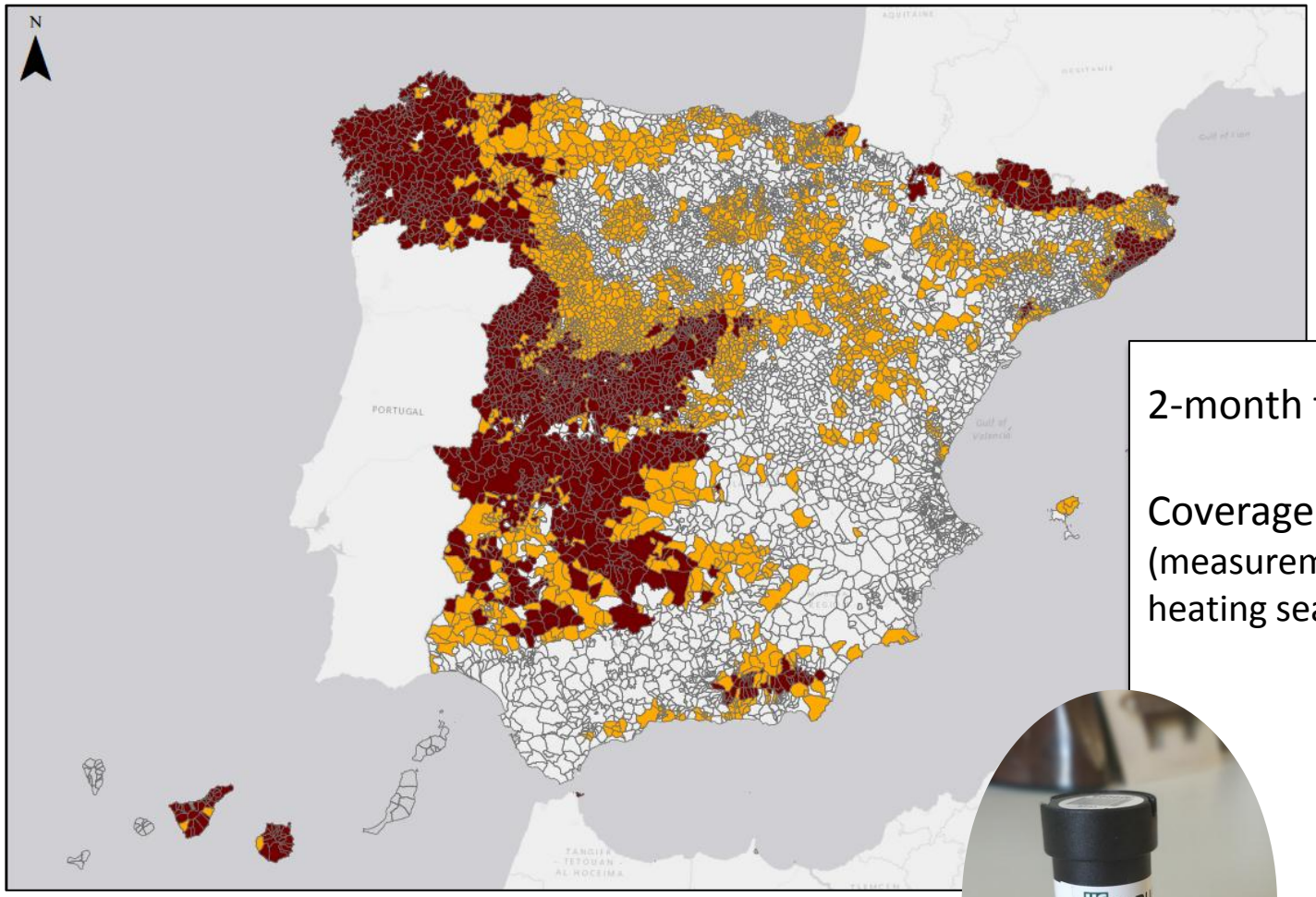
Class 0, Class 1, Class 2

3. Building Regulation

Existing Buildings

- ✓ Sealing of cracks and joins
- ✓ Improvement of crawl-space ventilation
- ✓ Improvement of the building ventilation system (BM)
- ✓ Soil depressurisation
- ✓ Radon barrier

3. Building Regulation



2-month test

Coverage factor: 1.4
(measurements out of the heating season in zones C, D & E)

Thank you for your attention!

Contact: Marta García-Talavera
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