Radiological evaluation of by-products used in construction and alternative applications; **Preparation of By-BM natural radioactivity database**

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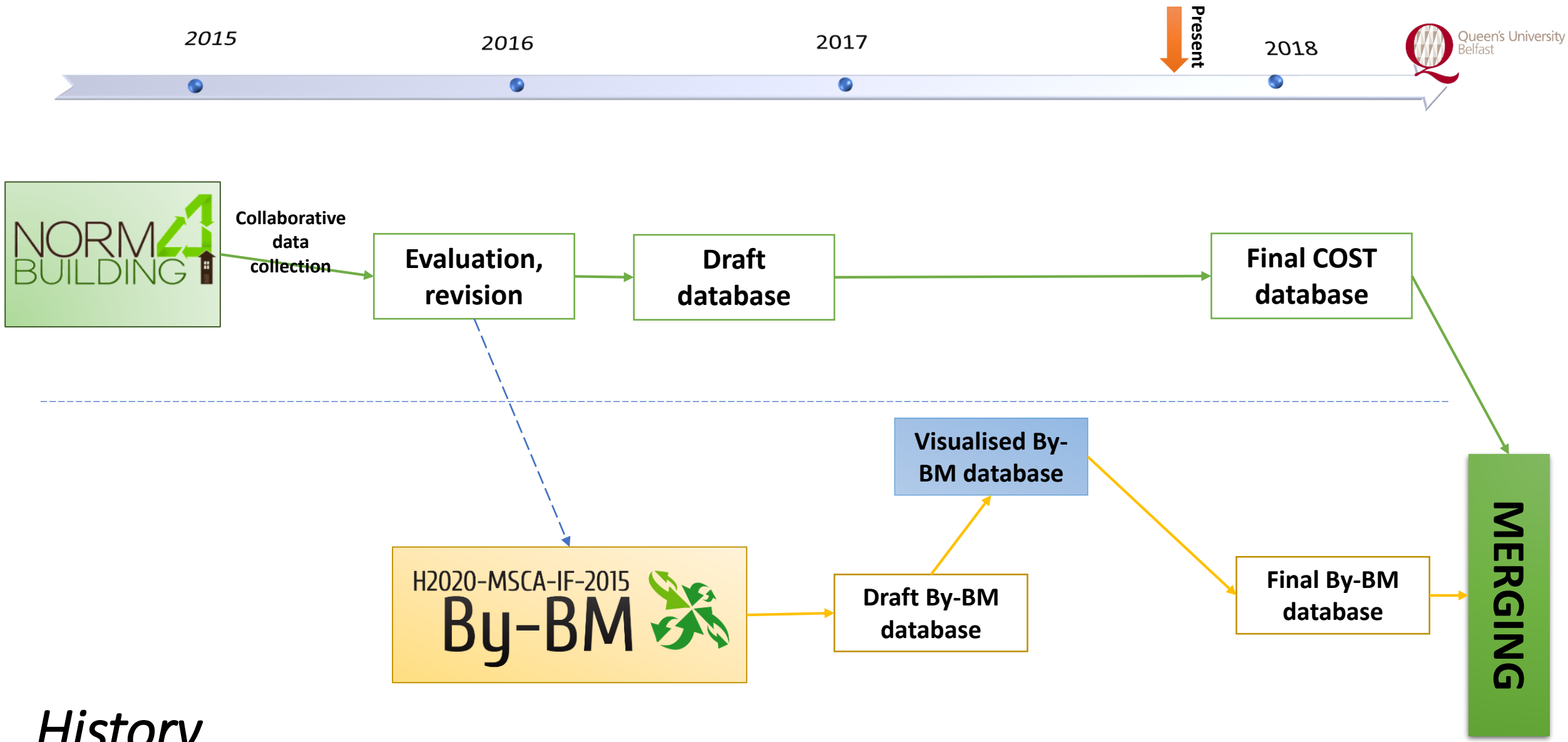
"The By-BM Project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No 701932"

Why?

General reason

New eco-innovative construction materials	• The depletion of raw materials and development of low CO_2 construction materials
Important EU policy driver	• EU's Waste Framework Directive with its objective to reach 70% of preparation for reuse, recycling and other forms for material recovery
Reuse of industrial by-products	• Beneficial from economical point of view
Concerns from hazardous content	• Elevated natural radionuclide content can pose increased risk



History

Database concepts

Why?

Inhomogenity of reported infromtaion

An overall insight view into the radiological features

- **The review of the reported scientific data and a proper dose assessment method are necessary before reuse**

Reported scientific data

- Generally the activity concentrations are presented as a range with a mean value
- Several magnitude range

Problems

- Does not allow:
  - Statistical analysis
  - Classification
  - Mixing calcualtion
  - Dose prediction

Approach

Manual Data mining (By-BM Database)

Manual data mining	• Data collection for By-BM Project • Scientic reported data (articles)
Selection criteria	• K-40, Th-232, Ra-226 (gamma spect.) • Only individual sample data • Average value only e.g. from the same type, querry, deposit
Classification	• I-index, Ra_{eq} index, etc.
Distribution analysis	• Main statistical parameters
Visualisation	• Dinamic suface with active filtering

Results & Conclusions

H2020-MSCA-IF-2015 By-BM Database

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Record info

- No of materials: 28 (21 BM; 7 BP)
- Total records: 1526 (1095 BM; 436 BP)
  - 48 countries

Distribution analysis

- Mean value of Ra-226, Th-232 and K-40 content were 2.52, 2.35 and 0.39 times higher in case of the BPs

Visualisation

- Demo version is ready

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Natural radioactivity database

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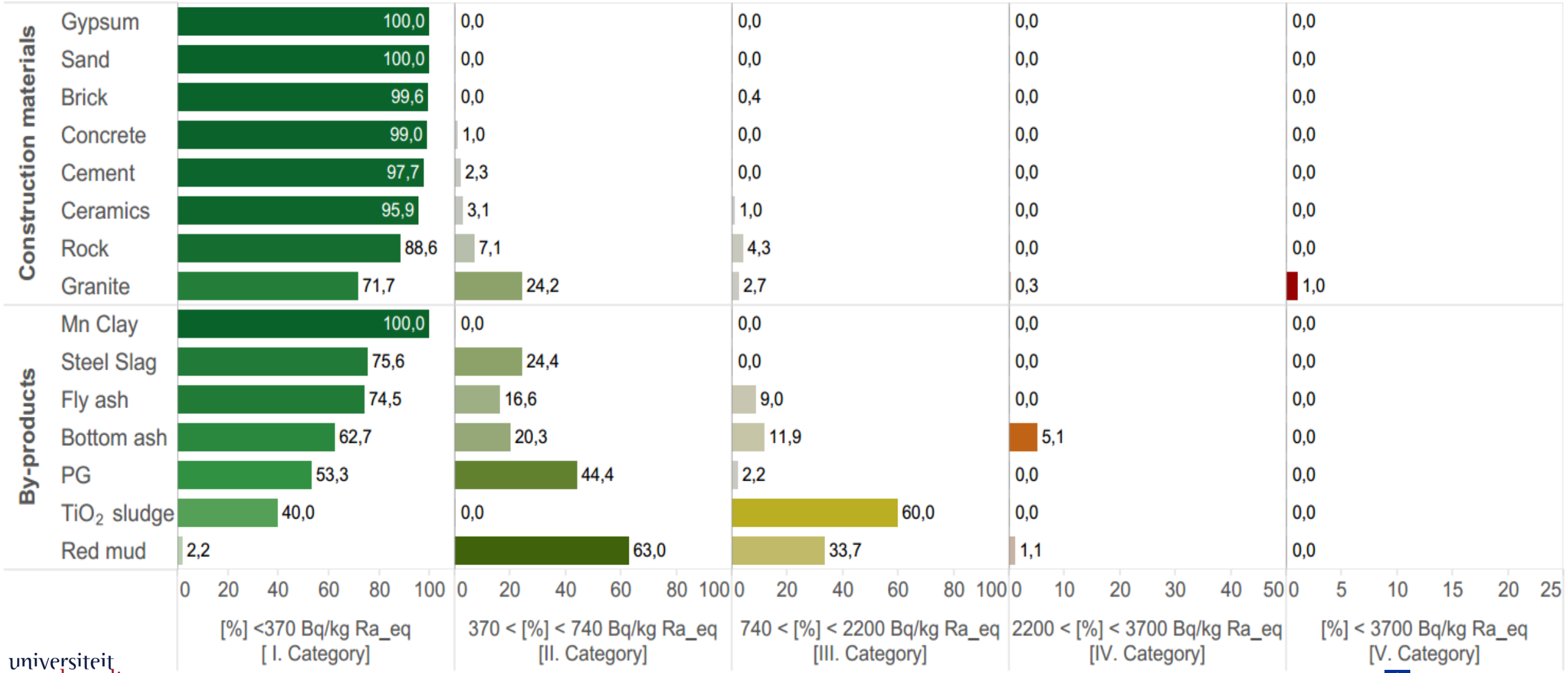
Results & Conclusions

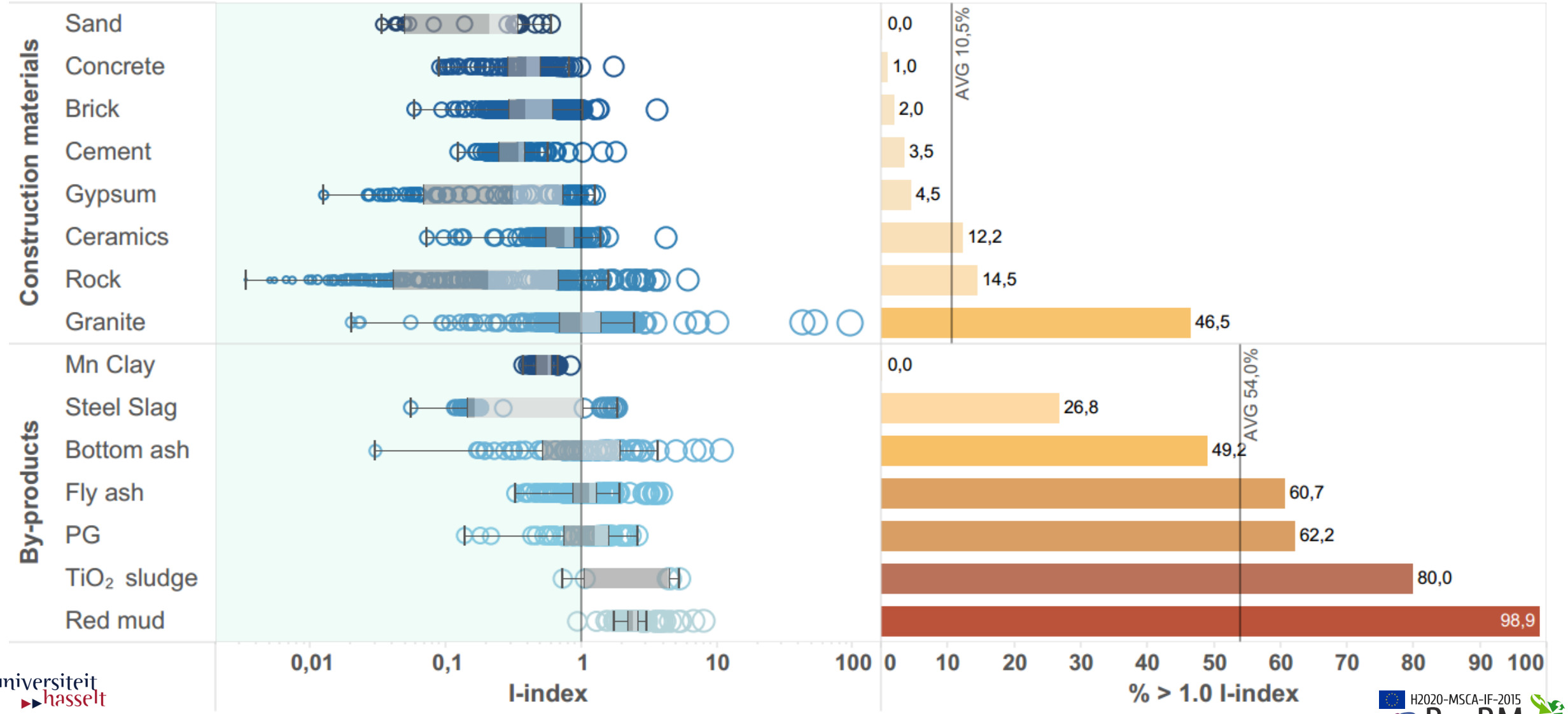
Ra eq conentration of datamined materials



Results & Conclusions

H2020-MSCA-IF-2015 By-BM

I-index of datamined materials



Results & Conclusions

H2020-MSCA-IF-2015 By-BM Database Article

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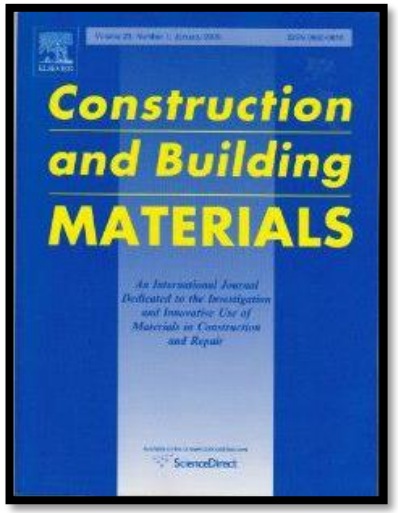
Published paper	• Construction and building materials (27 May 2017)
Title	• Radiological evaluation of by-products used in construction and alternative applications; **Part I. – preparation of natural radioactivity database**
Target group	• Cross-disciplinary • Construction material experts
Main achievement	• Statistical analysis • Visualized database
Practical tool	• Mixing ratio prediction



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Online channels

Dissemination

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