Supplementary Material for

# Pan-European assessment of coastal flood hazards

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**Table S1 State-of-the-Art on existing large-scale coastal flooding studies centered on the estimation of flooding resulting from extreme events.**

| Study | Flooding resolution | Dynamic flood modeling | Wave contribution | Variable foreshore slope | Methodology validation |
|---|---|---|---|---|---|
| Present study | 25 m | x | Semi-empirical | x | x |
| Wing et al. (2024) | 30 m | x | Empirical | | |
| Le Gal et al. (2023) | 100 m | x | Empirical | | x |
| Kirezci et al. (2020) | 1 km | | Semi-empirical | | |
| Paprotny et al. (2018) | 100 m | | | | x |
| Vousdoukas et al. (2016) | 90 m | x | Empirical | | x |
| Muis et al. (2016) | 1 km | | | | |
| Groenemeijer et al. (2016) | 25 m | | | | x |

**Table S2 Relative maximum flooded area (%) resulting from a 100-yr TWL under different flood modeling approaches (static vs dynamic), hydrograph shapes (triangular vs smooth-shaped) with a combined scenario and different types of storms, per country. Values are shown relative to each floodplain to facilitate the comparison of results.**

| Country | Static flood modeling | Dynamic flood modeling | | | | | |
|---|---|---|---|---|---|---|---|
| | | Triangular hydrograph | Smooth-shaped hydrographs | | | | |
| | | | Combined scenario | ST A | ST B | ST C | ST D |
| **Albania** | 37.43 | 28.42 | 27.32 | 13.79 | 0.00 | 26.31 | 27.30 |
| **Belgium** | 33.51 | 6.61 | 7.83 | 0.00 | 7.77 | 8.31 | 0.00 |
| **Bosnia and Herzegovina** | 5.5 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Croatia** | 20.04 | 14.98 | 12.65 | 0.00 | 0.00 | 11.90 | 12.91 |
| **Cyprus** | 7.19 | 6.18 | 5.63 | 0.01 | 0.01 | 5.62 | 5.62 |
| **Denmark** | 24.95 | 22.8 | 22.29 | 4.26 | 0.12 | 18.13 | 22.17 |
| **Estonia** | 4.83 | 3.36 | 3.34 | 3.32 | 0.00 | 0.01 | 3.34 |
| **Finland** | 19.07 | 17.78 | 17.71 | 17.70 | 0.00 | 0.00 | 17.68 |
| **France** | 38.74 | 12.35 | 14.33 | 0.22 | 11.60 | 2.33 | 2.73 |
| **Germany** | 47.99 | 35.23 | 35.58 | 0.29 | 24.62 | 35.67 | 6.63 |
| **Greece** | 14.09 | 12.17 | 11.89 | 4.28 | 1.11 | 7.77 | 10.89 |
| **Ireland** | 24.47 | 14.49 | 15.23 | 0.00 | 15.19 | 14.54 | 0.06 |
| **Isle of Man** | 10.48 | 8.12 | 8.59 | 0.00 | 8.59 | 0.01 | 0.01 |
| **Italy** | 28.39 | 22.34 | 21.01 | 1.57 | 0.00 | 20.28 | 21.56 |
| **Latvia** | 13.5 | 6.26 | 5.90 | 5.90 | 0.00 | 0.00 | 5.91 |
| **Lithuania** | 29.63 | 25.68 | 24.63 | 24.76 | 0.00 | 0.01 | 24.66 |
| **Malta** | 22.19 | 19.92 | 19.91 | 19.92 | 0.00 | 19.91 | 19.92 |
| **Montenegro** | 44.83 | 3.12 | 3.08 | 0.00 | 0.00 | 3.04 | 3.08 |
| **Netherlands** | 69.93 | 45.46 | 46.23 | 0.00 | 29.83 | 46.55 | 0.00 |
| **Norway** | 32.13 | 27.76 | 27.85 | 0.84 | 17.18 | 25.83 | 6.72 |
| **Poland** | 45.58 | 36.54 | 34.97 | 26.40 | 0.00 | 8.78 | 35.04 |
| **Portugal** | 23.17 | 12.13 | 13.03 | 0.03 | 13.03 | 1.95 | 0.03 |
| **Russia** | 27.28 | 18.73 | 17.31 | 15.80 | 0.00 | 0.53 | 17.20 |
| **Slovenia** | 32.23 | 25.56 | 25.59 | 0.00 | 0.00 | 25.58 | 0.00 |
| **Spain** | 26.62 | 10.15 | 10.07 | 5.88 | 3.85 | 3.88 | 6.20 |
| **Sweden** | 11.44 | 8.91 | 8.59 | 7.68 | 0.00 | 1.49 | 8.59 |
| **Turkey** | 0.89 | 0.76 | 0.76 | 0.02 | 0.03 | 0.77 | 0.76 |
| **United Kingdom** | 43.66 | 12.33 | 14.10 | 0.00 | 13.74 | 5.56 | 0.23 |

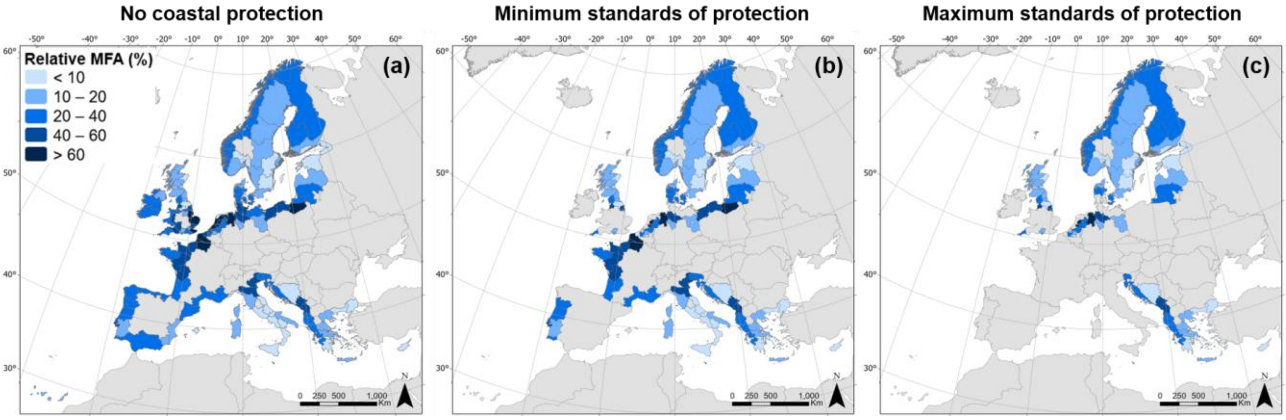


**Figure S1: European spatial distribution of 100-yr TWL flood hazards without coastal protection (a) and with coastal minimum (b) and maximum (c) standards of protection using a static flood model. Results are shown as relative MFA in regards to the floodplain area of each NUTS2. Standards of coastal protections were obtained from the COASTPRO-EU database (van Maanen et al., 2025).**

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