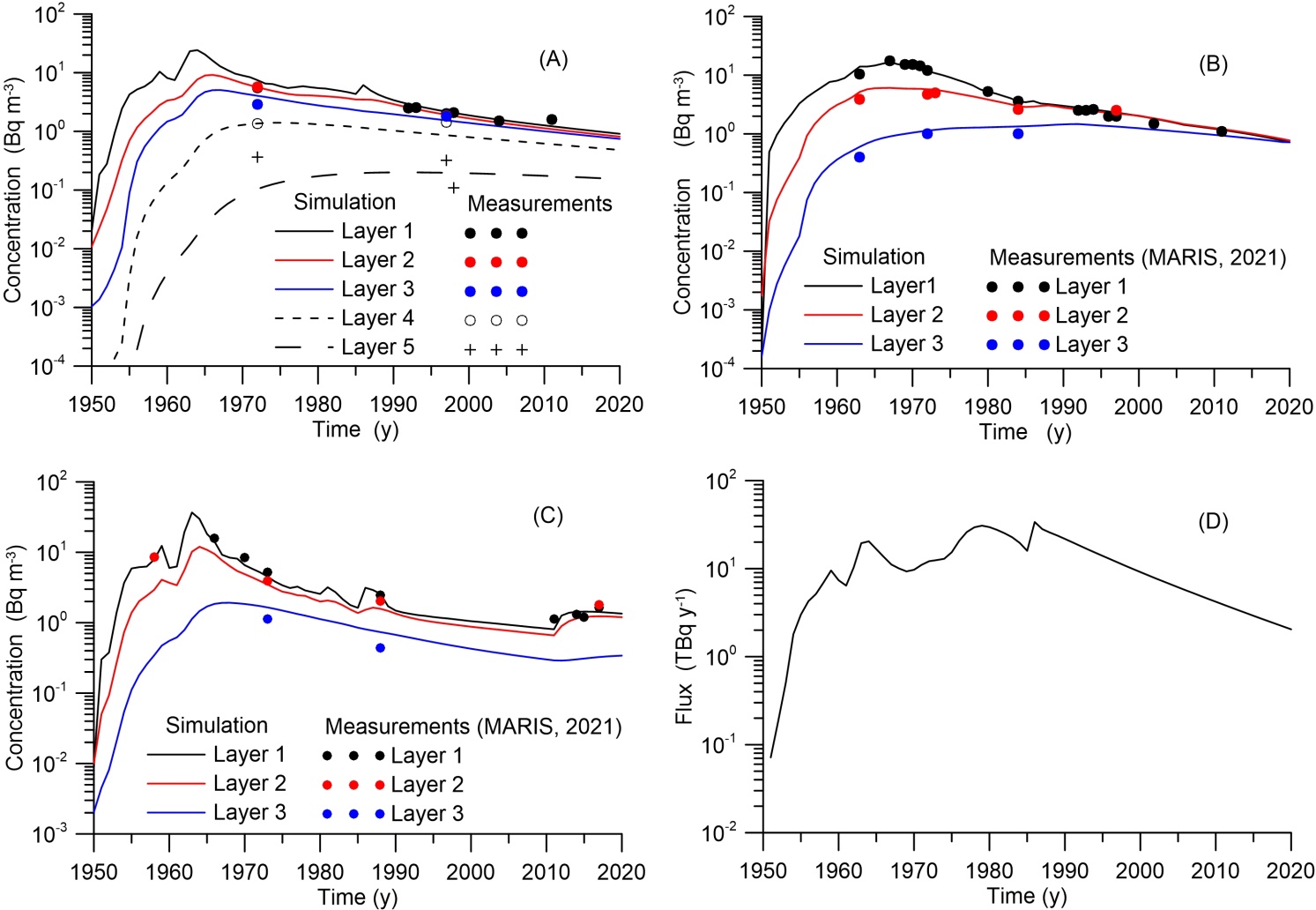
Supplementary Material

Table S1. River runoff in the modeling area

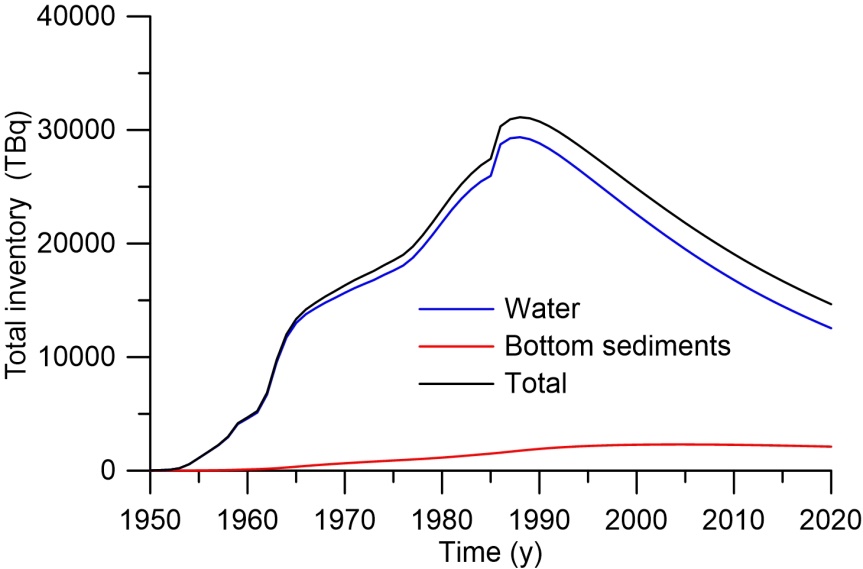
|  |  |  |
| --- | --- | --- |
| River | Water runoff, km3 y-1 | Box with river mouth |
| Rhine | 91.5 | 64 |
| Elba | 27.2 | 60 |
| Seine | 17.8 | 66 |
| Loire | 26.3 | 95 |
| Garonne | 20.2 | 97 |
| Northern Dvina | 110 | 26 |
| Pechora | 129 | 26 |
| Ob | 394 | 24 |
| Yenisei | 624 | 24 |
| Lena | 515 | 21 |
| Hatanga | 105 | 21 |
| Indigirka | 50 | 20 |
| Kolyma | 120 | 20 |
| Mackenzie | 306 | 8 |
| Nelson | 75 | 141 |
| Saint Lawrence | 311 | 113 |



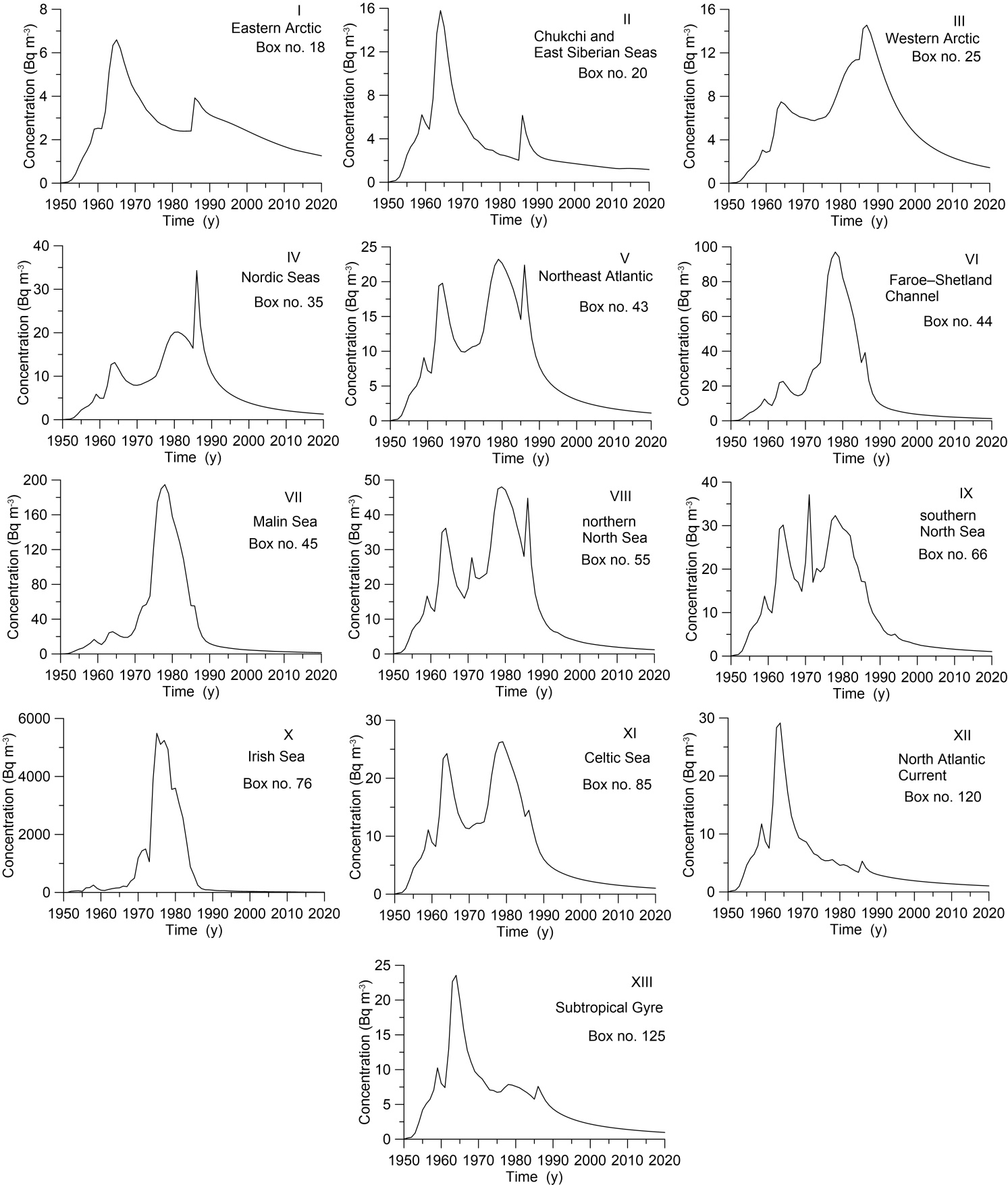
**Supplementary Figure 1.** (a) Structure of a compartment system in the POSEIDON-R model (Maderich et al., 2018a). (b) Radionuclide transfers from the water and bottom sediment boxes to marine organisms (Bezhenar et al., 2016a). The radionuclide transfers among marine food web compartments are given for 11 types of marine organisms.



**Supplementary Figure 2.** Comparison of the model-predicted concentration of 137Cs in compartment layers with measurements (MARIS, 2021) in Central Atlantic (A), the Gibraltar Strait (b), Bering Sea (C), and model predicted flux of 137Cs in the Danish Straits to the North Sea (D).



**Supplementary Figure 3.** Inventory of 137Cs in the Arctic Oceans.

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**Supplementary Figure 4.** Etalon box distribution of 137Cs concentration in water for regions I-XIII in Fig. 10-11.