**Supporting Information for**

# MITgcm-RN v1.0: Modeling the Transport and Fate of Radionuclides Released from Nuclear Power Plants Wastewater in the Global Ocean Using MITgcm_c65i with the Radionuclide Module

Mao Mao[12#], Yujuan Wang[2#*], Peipei Wu[3], Shaojian Huang[2], Zhengcheng Song[2], Yanxu Zhang[1*]

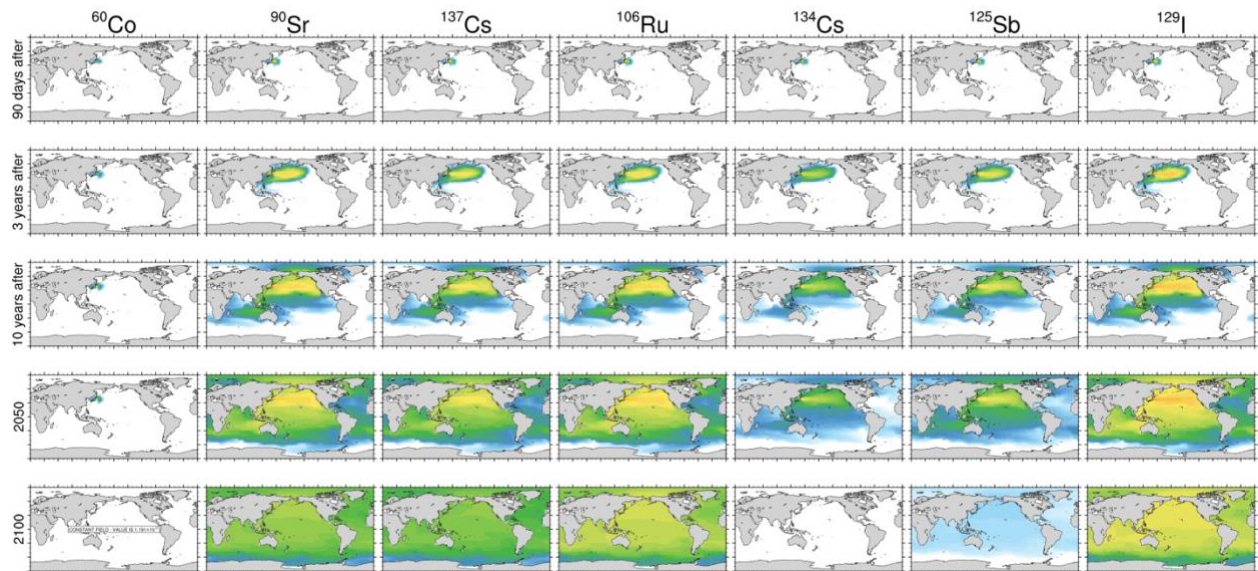
[1]Department of Earth and Environmental Sciences, Tulane University, New Orleans, LA, 70118, USA

[2]School of Atmospheric Sciences, Nanjing University, Nanjing, Jiangsu, 210023, China

[3]Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA 92093, USA

[*]Corresponding author: yzhang127@tulane.edu (Y. Z.); yjwang@smail.nju.edu.cn (Y.W.)

[#]These authors contributed equally to this work.

# Dissolved(Low-end estimate)

# Dissolved(Intermediate estimate)

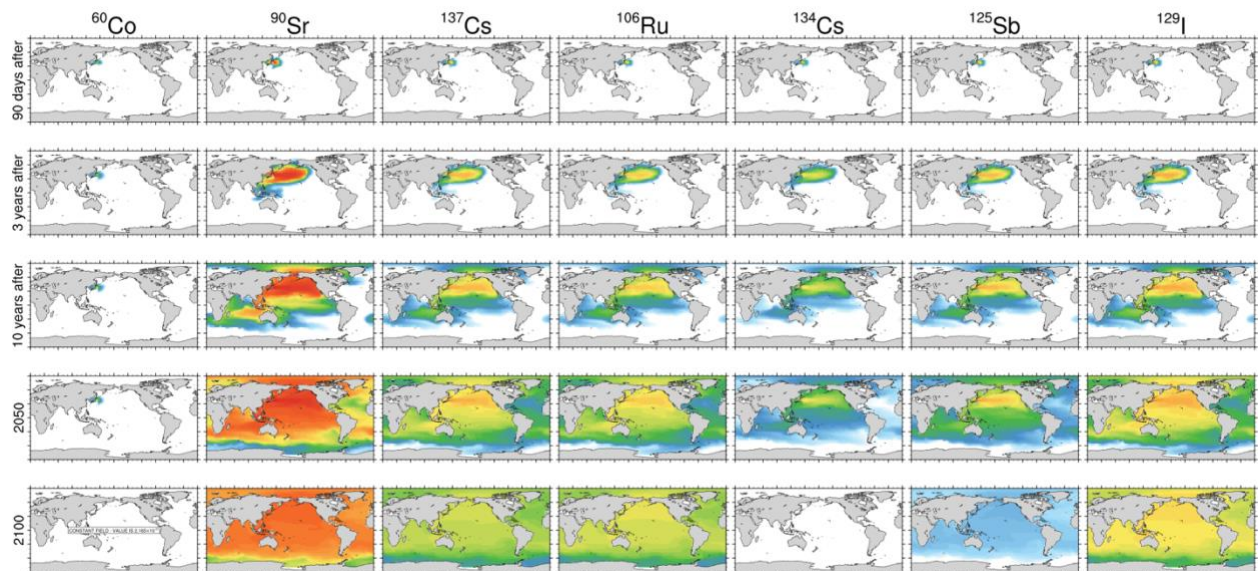
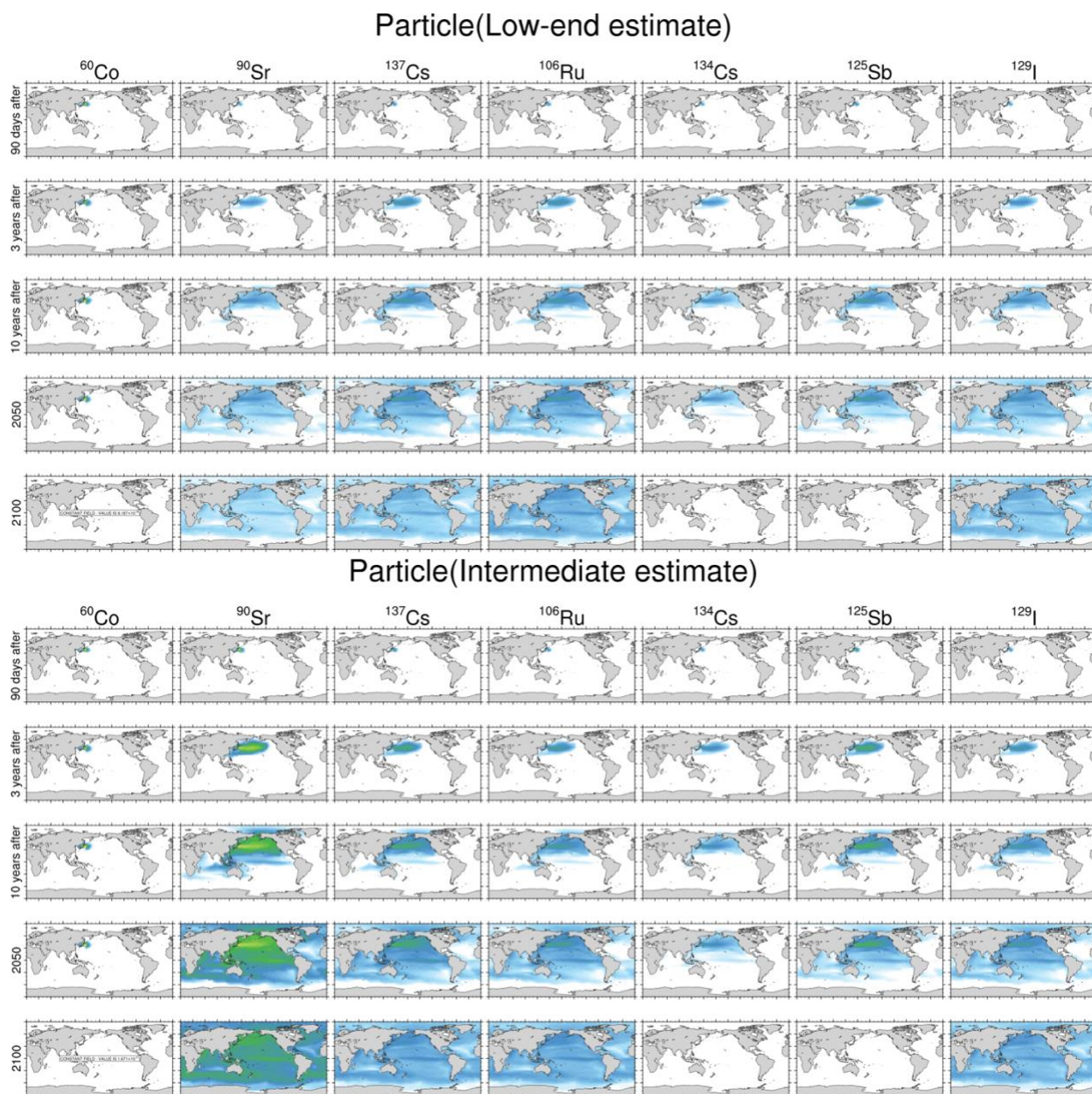



Figure S1. Projected spatial distribution of dissolved and particulate primary radionuclides in the seawater in the 21st century ocean under three scenarios.

Low-end

a) Seawater Concentration

b) Sediment Concentration

Legend:
- Global
- Fukushima
- NW Pacific
- N Pacific
- S Pacific
- N Atlantic
- S Atlantic
- Indian
- Arctic
- Southern
- near Fukushima

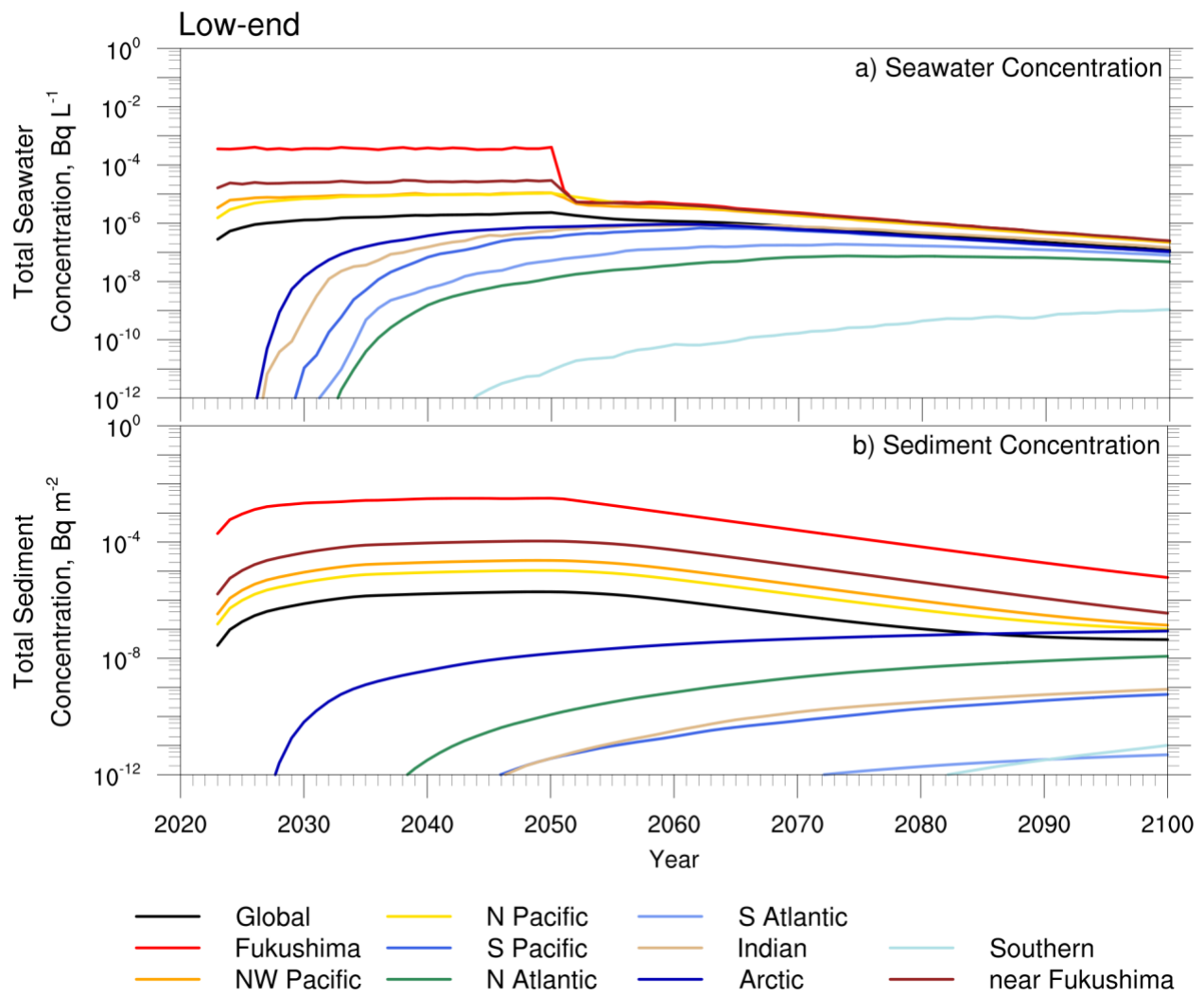
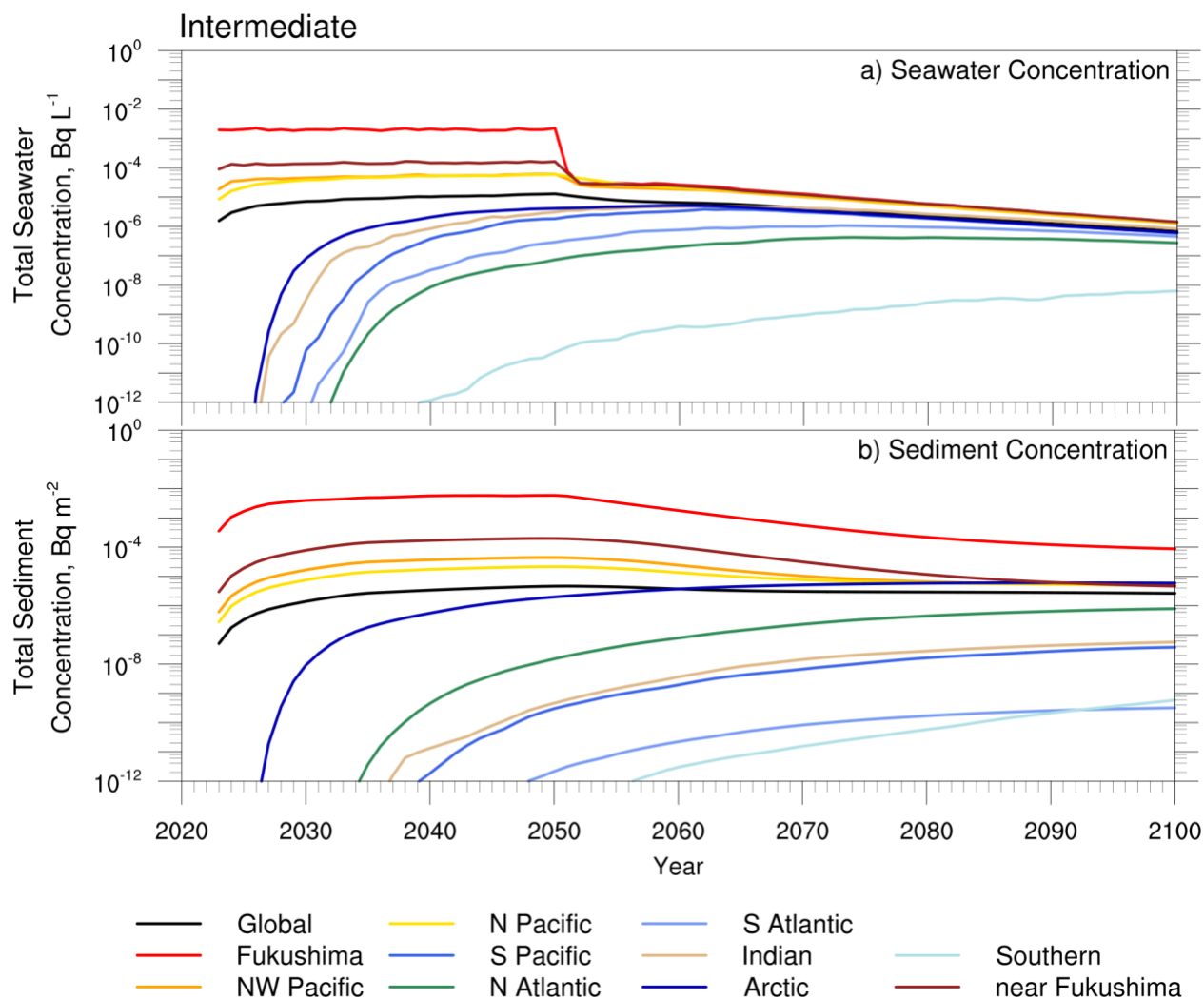



Figure S2. Projected total radionuclide a) concentrations and b) sedimentation fluxes over different ocean basins for low-end and intermedia scenarios.

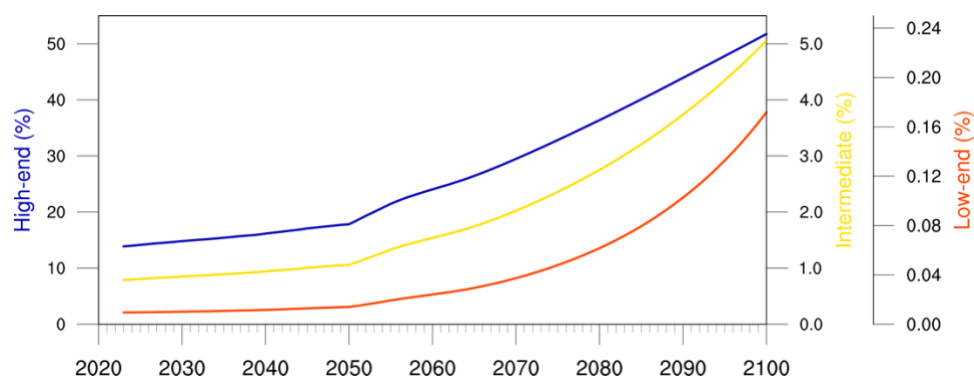



Figure S3. Global average fraction of primary seven nuclides over the total nuclide concentrations. Blue, yellow, and red curves are for high-, intermediate, and low-end emission scenarios, respectively. Note each with a separate y-axis.

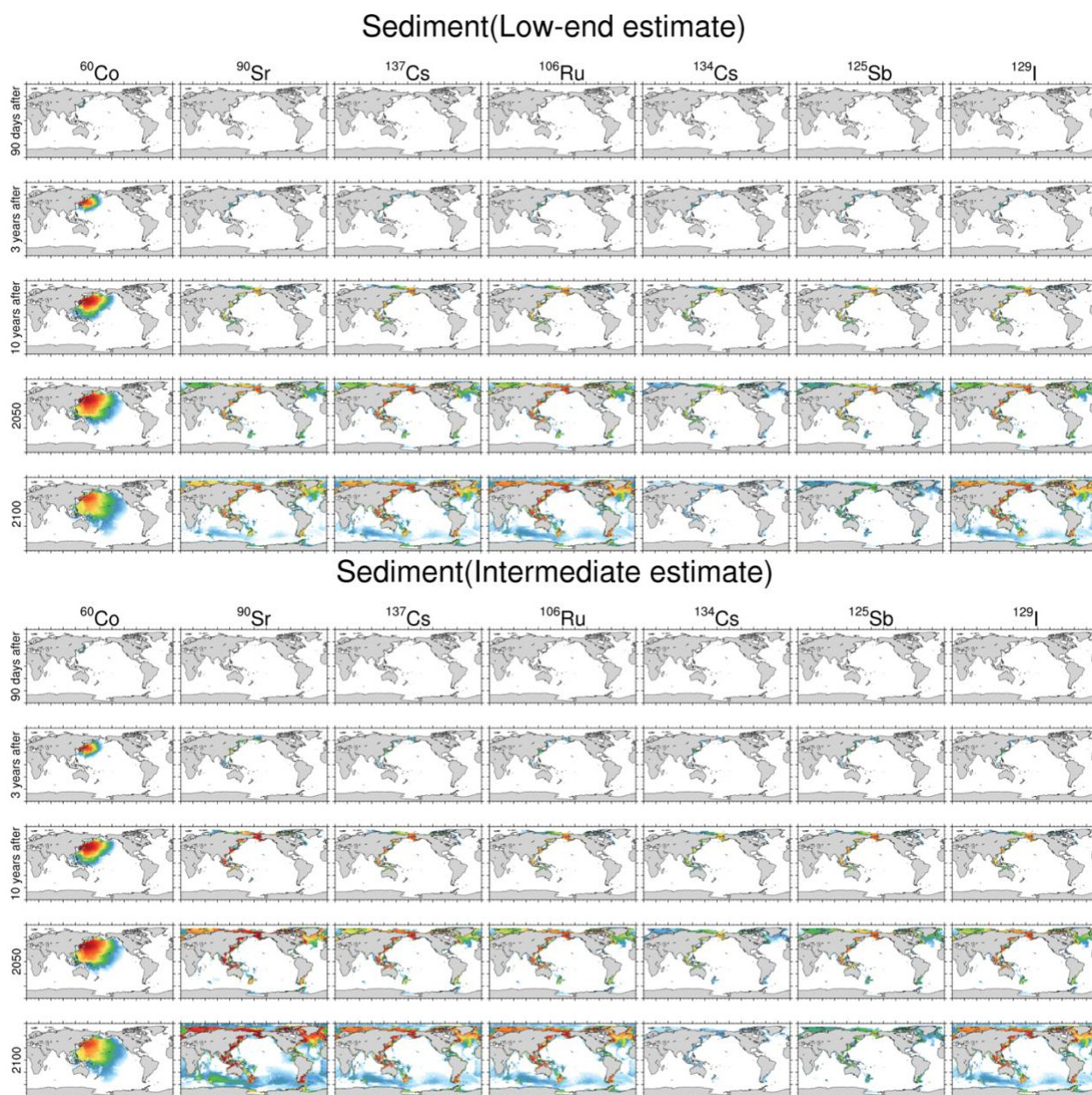



Figure S4. Projected spatial distribution of the sediment flux of primary seven radionuclides in the 21$^{st}$ century ocean under the low and intermedia scenarios.

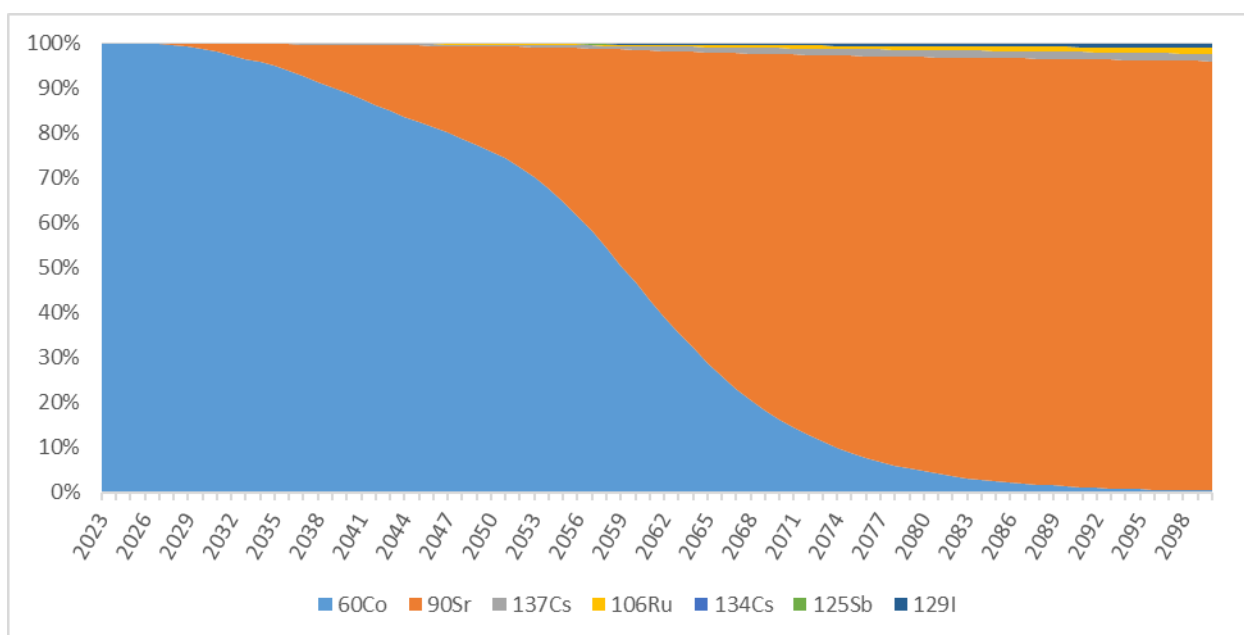
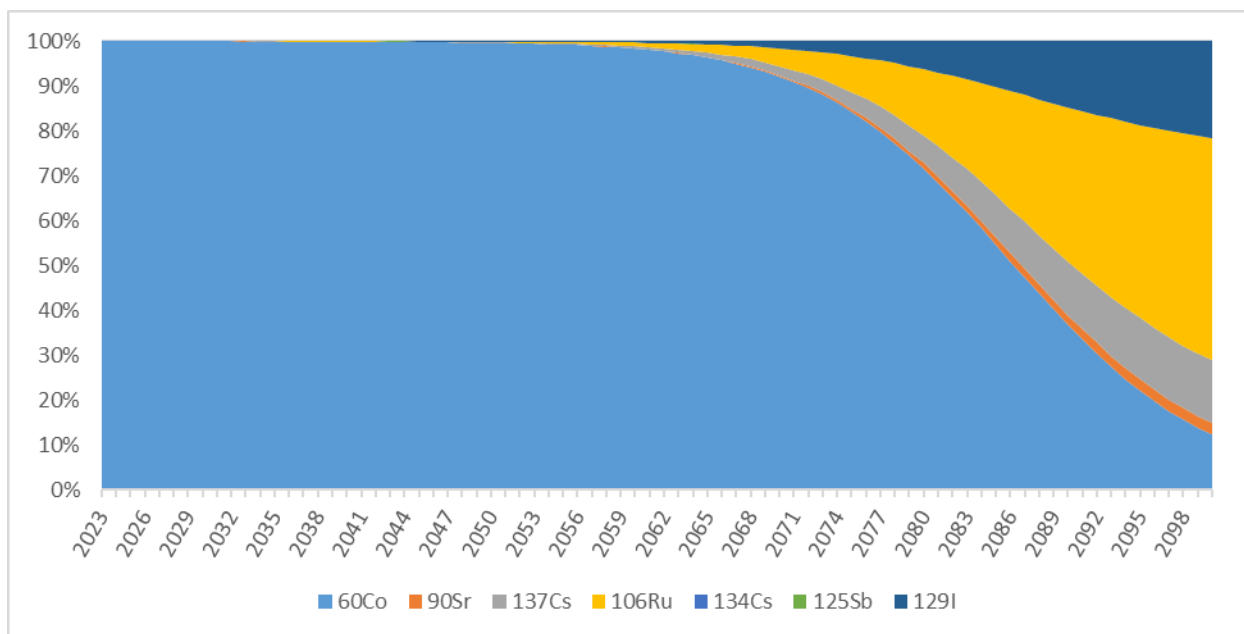
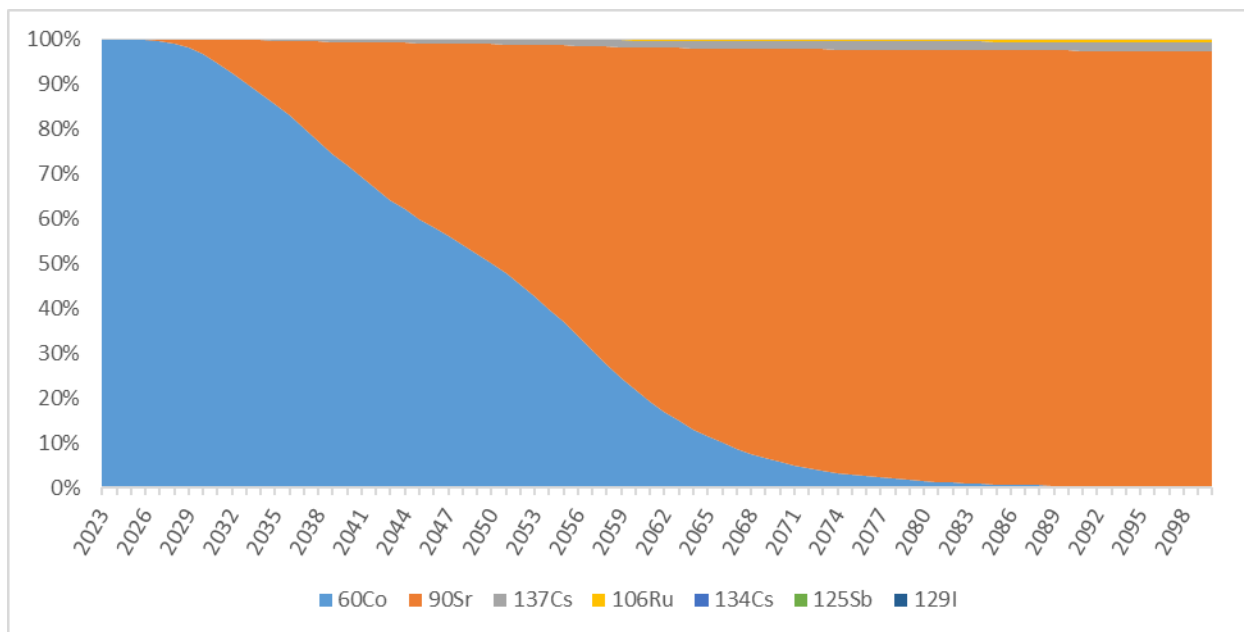



Figure S5. Relative contribution of different nuclides in the global sediments (from top to bottom are low-end scenario, intermediate scenario, and high-end scenario, respectively).

# u(m s$^{-1}$)

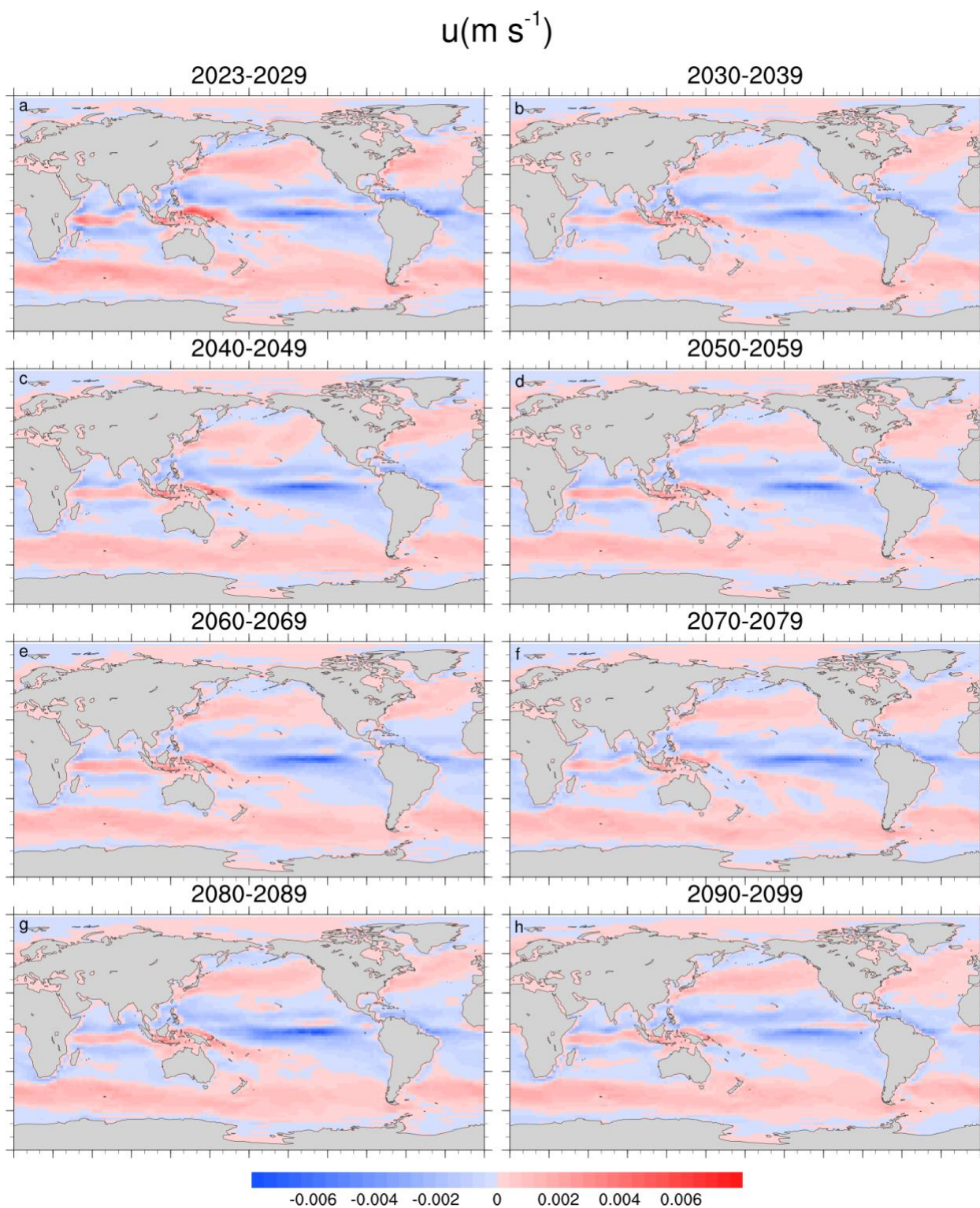



Figure S6. Surface ocean current velocities: U

v(m s$^{-1}$)

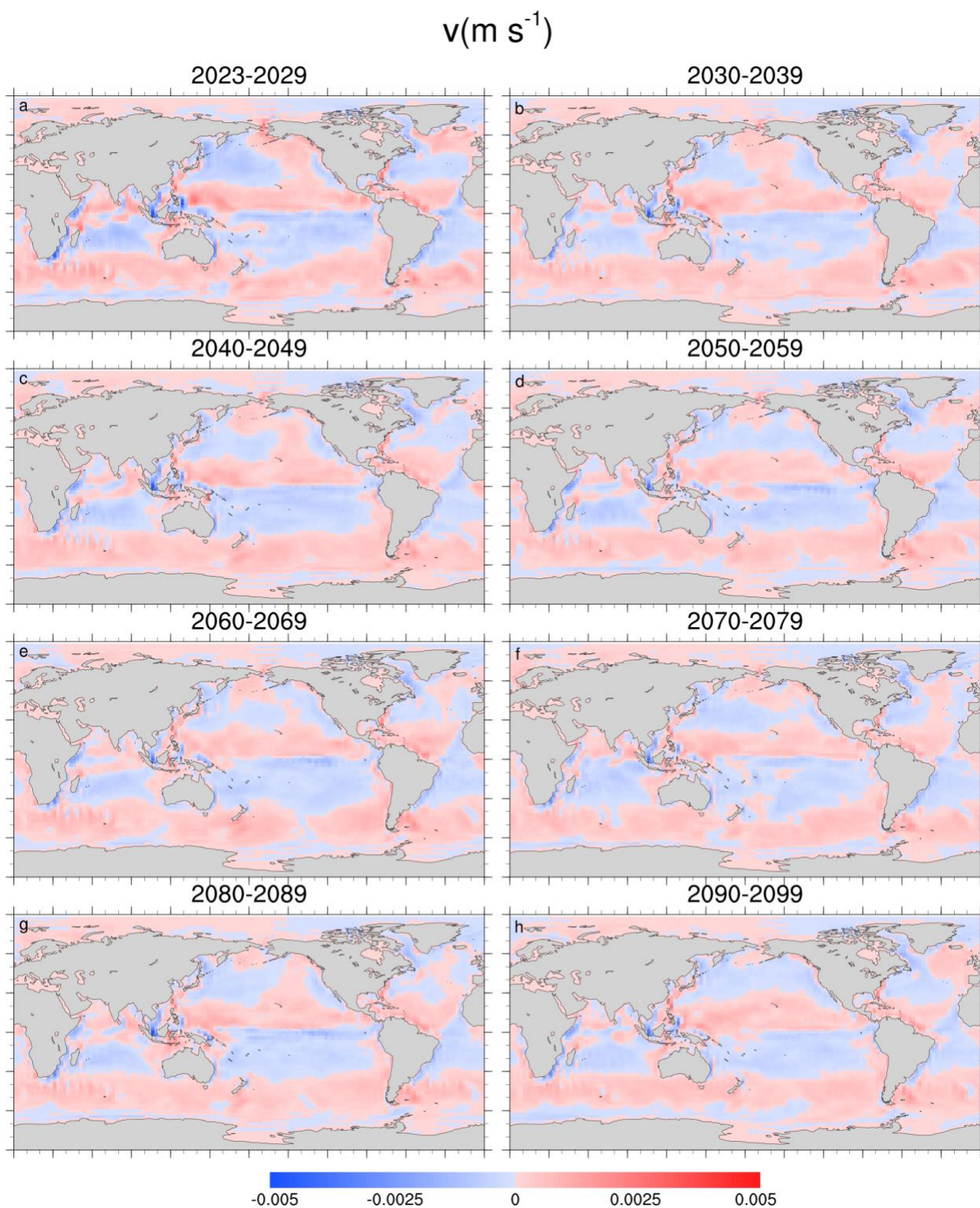



Figure S7. Surface ocean current velocities: V

$$w(m \ s^{-1})$$

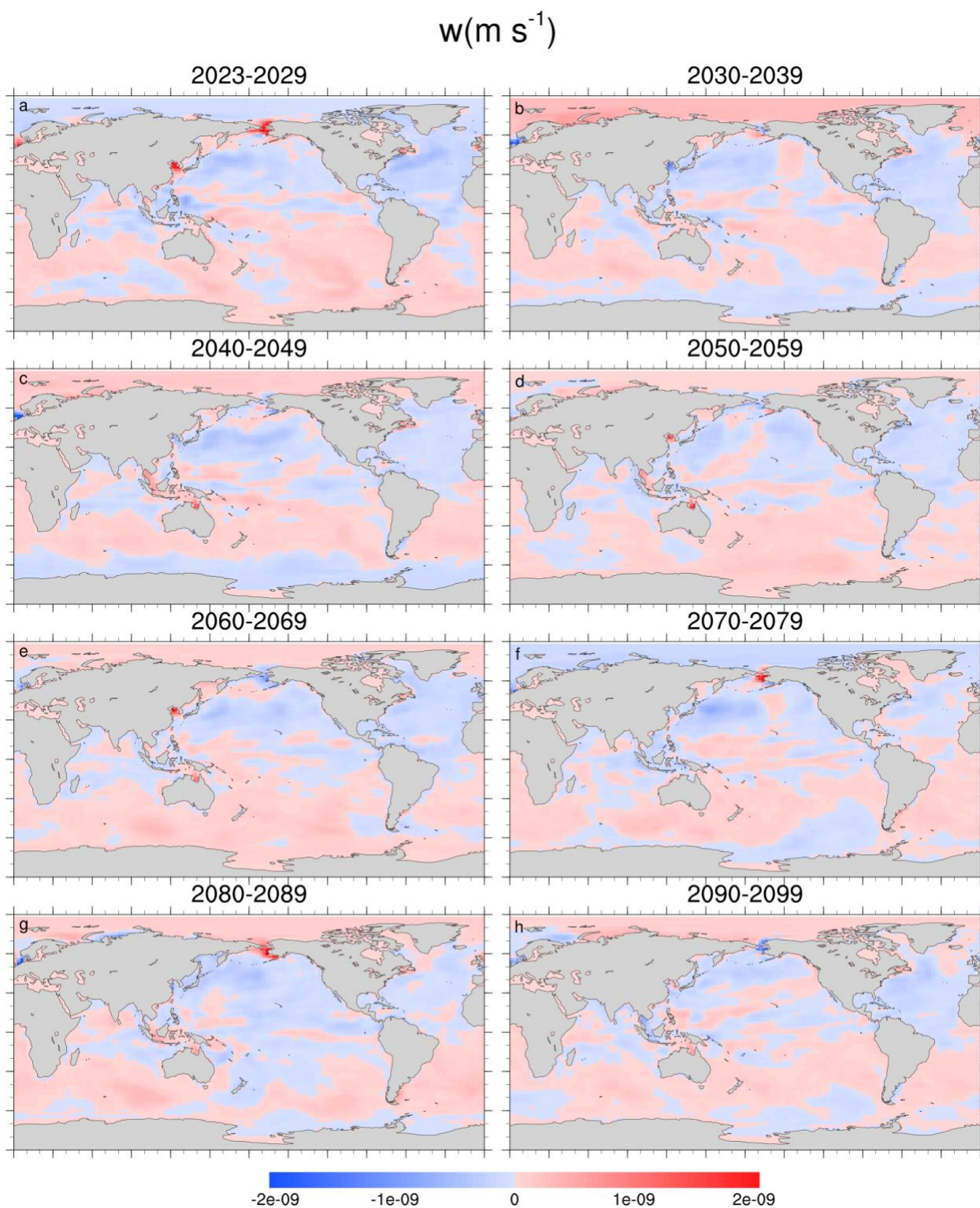



Figure S8. Surface ocean current velocities: W

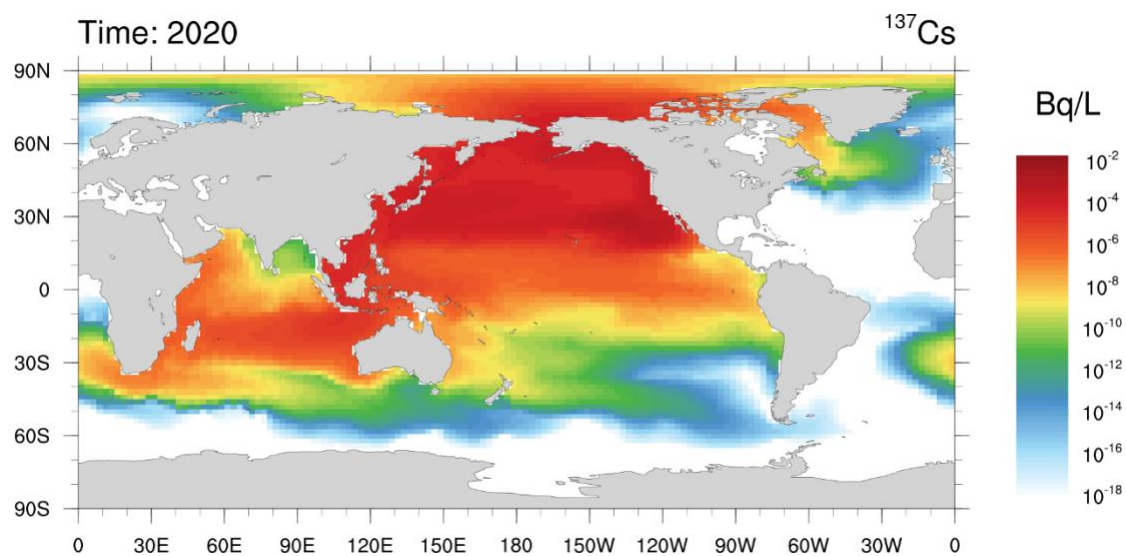



Figure S9. Global distribution of simulated ^{137}Cs in 2020 from the verification scenario experiment.