



Supplement of

The global impact of the transport sectors on the atmospheric aerosol and the resulting climate effects under the Shared Socioeconomic Pathways (SSPs)

Mattia Righi et al.

Correspondence to: Mattia Righi (mattia.righi@dlr.de)

The copyright of individual parts of the supplement might differ from the article licence.

In this Supplement additional figures are shown supporting the discussion in the main paper:

Fig. S1 Land transport impact on surface-level NO_3 concentration.

Fig. S2 Land transport impact on surface-level POM concentration.

Fig. S3 Land transport impact on surface-level SO_4 concentration.

Fig. S4 Land transport impact on surface-level NH_4 concentration.

Fig. S5 Land transport impact on surface-level Aitken mode particle number concentration.

Fig. S6 Land transport impact on surface-level accumulation mode particle number concentration.

Fig. S7 Shipping impact on surface-level NO_3 concentration.

Fig. S8 Shipping impact on surface-level BC concentration.

Fig. S9 Shipping impact on surface-level POM concentration.

Fig. S10 Shipping impact on surface-level NH_4 concentration.

Fig. S11 Shipping impact on surface-level Aitken mode particle number concentration.

Fig. S12 Shipping impact on surface-level accumulation mode particle number concentration.

Fig. S13 Aviation impact on zonally-averaged NO_3 concentration.

Fig. S14 Aviation impact on zonally-averaged POM concentration.

Fig. S15 Aviation impact on zonally-averaged SO_4 concentration.

Fig. S16 Aviation impact on zonally-averaged NH_4 concentration.

Fig. S17 Aviation impact on zonally-averaged Aitken mode particle number concentration.

Fig. S18 Aviation impact on zonally-averaged accumulation mode particle number concentration.

Fig. S19 Zonal mean all-sky RF of land transport, shipping and aviation.

Land transport impact on NO₃

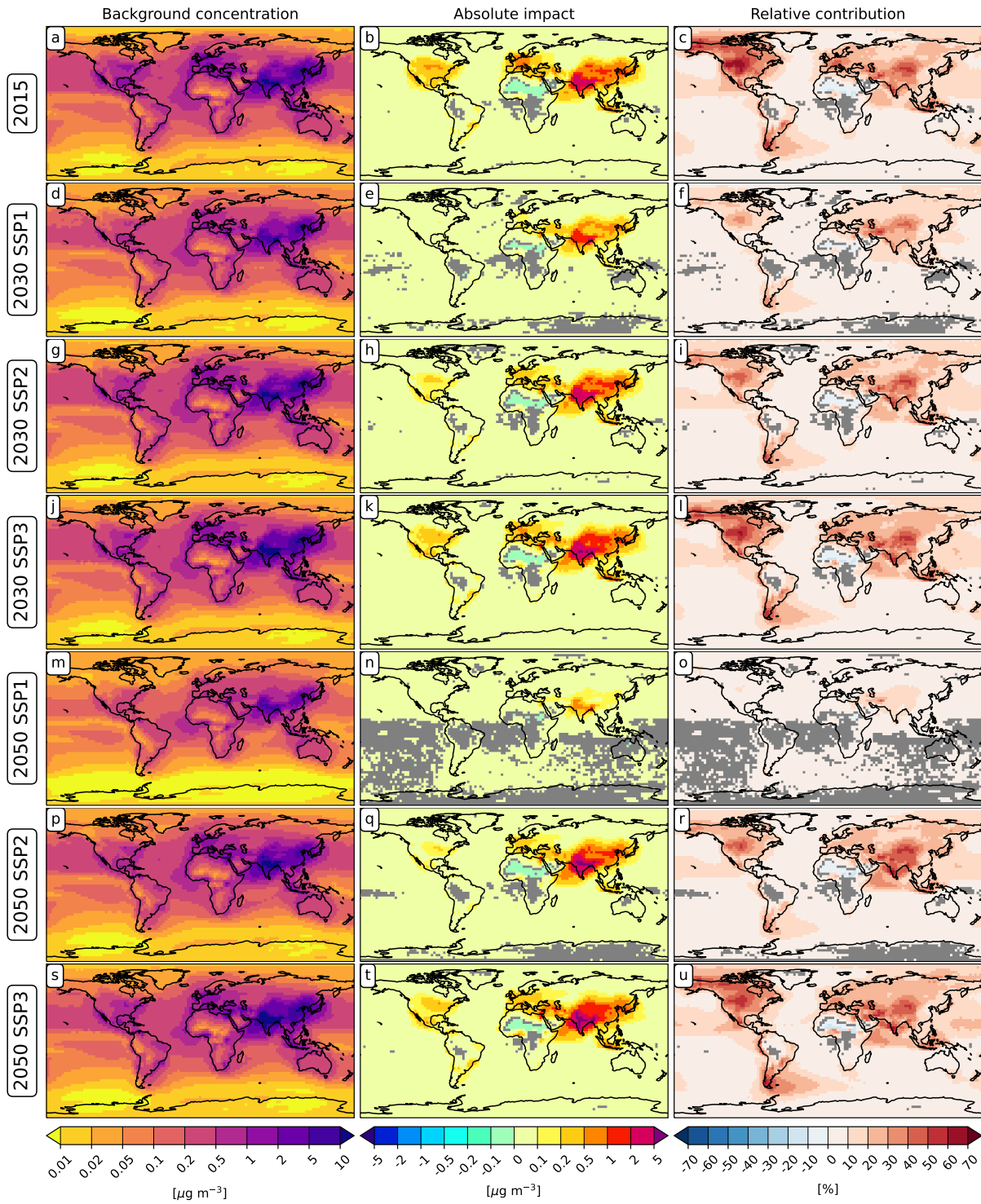


Figure S1: Land transport impact on surface-level NO₃ concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

Land transport impact on POM

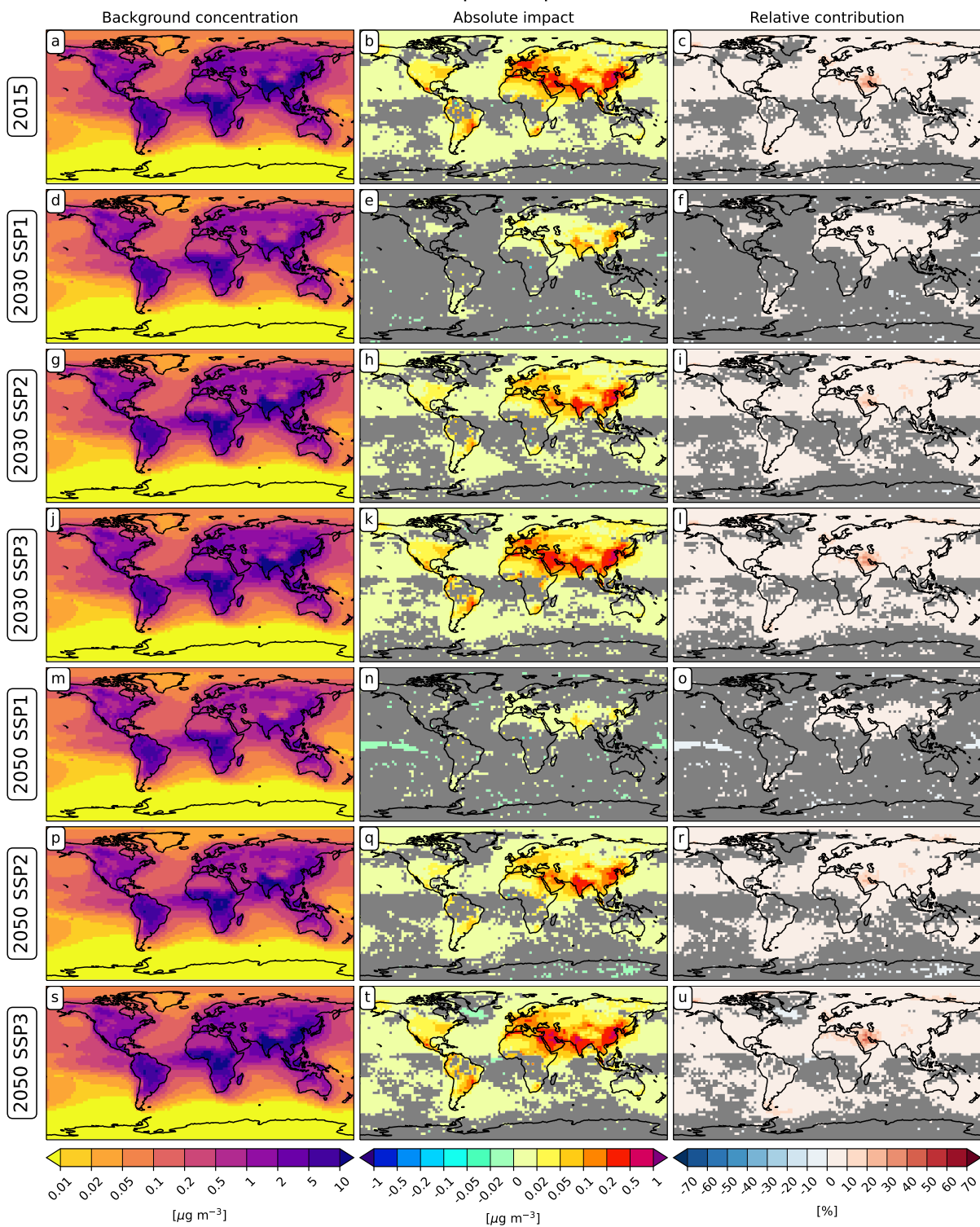


Figure S2: Land transport impact on surface-level POM concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

Land transport impact on SO₄

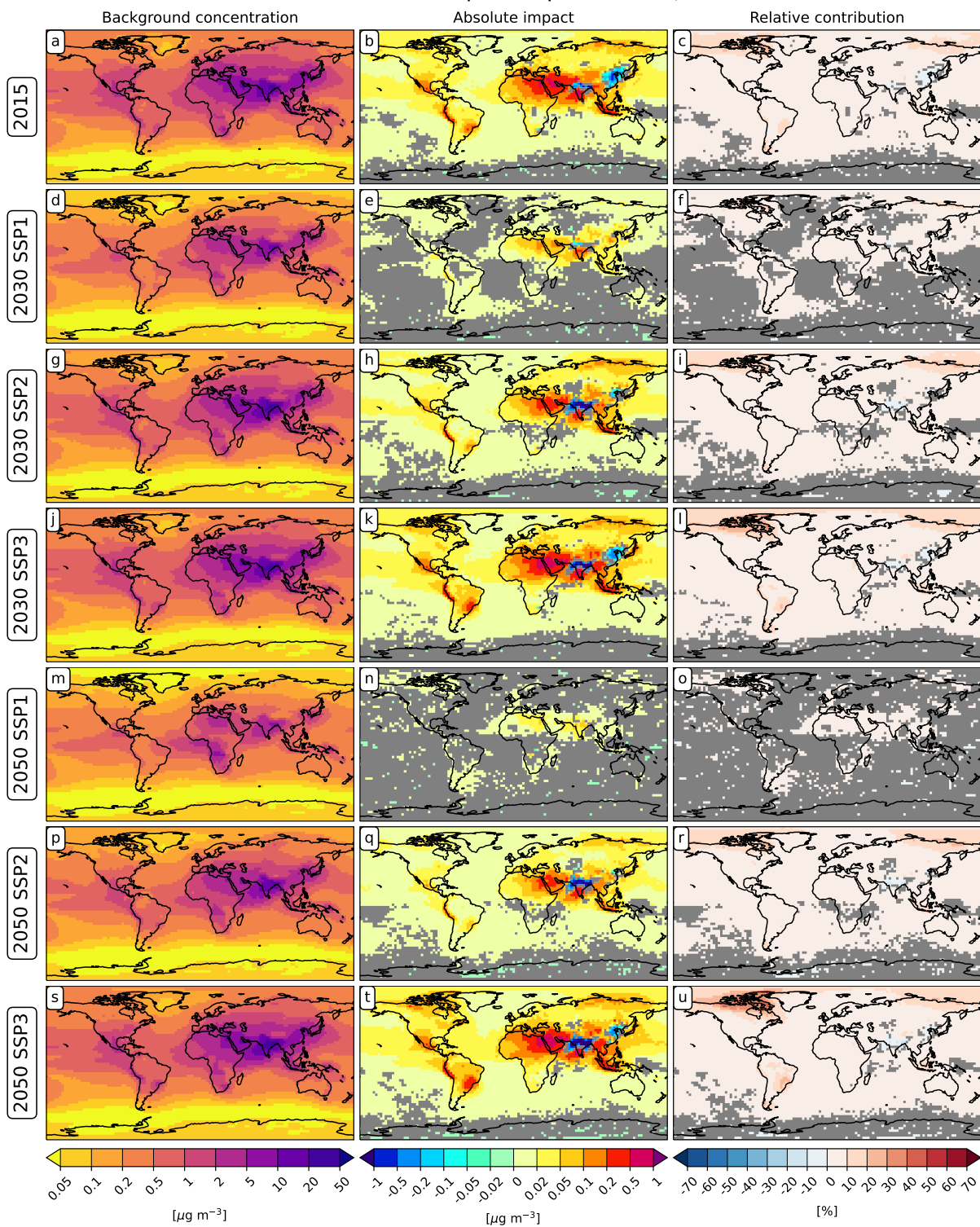


Figure S3: Land transport impact on surface-level SO₄ concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

Land transport impact on NH₄

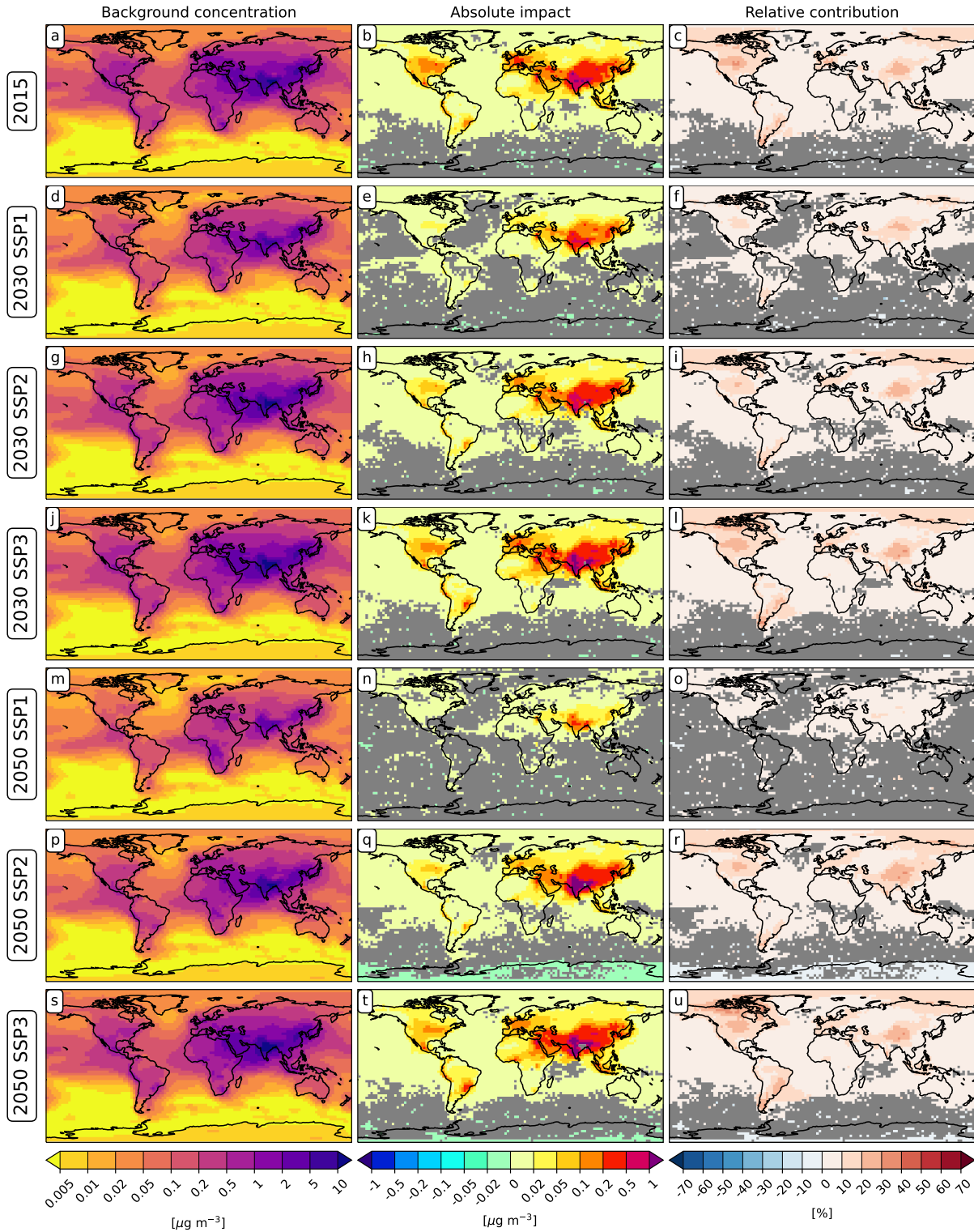


Figure S4: Land transport impact on surface-level NH₄ concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

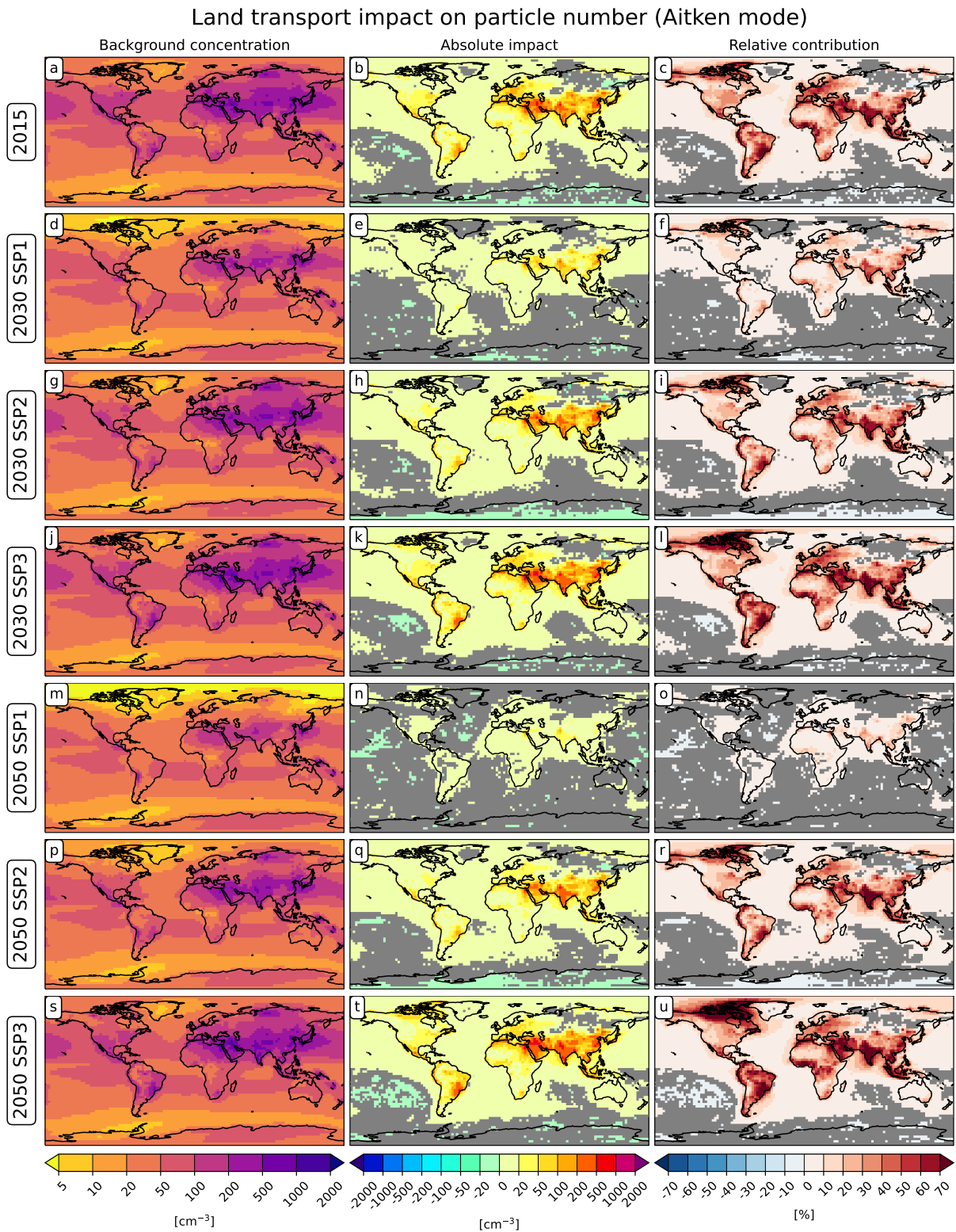


Figure S5: Land transport impact on surface-level Aitken mode particle number concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

Land transport impact on particle number (accumulation mode)

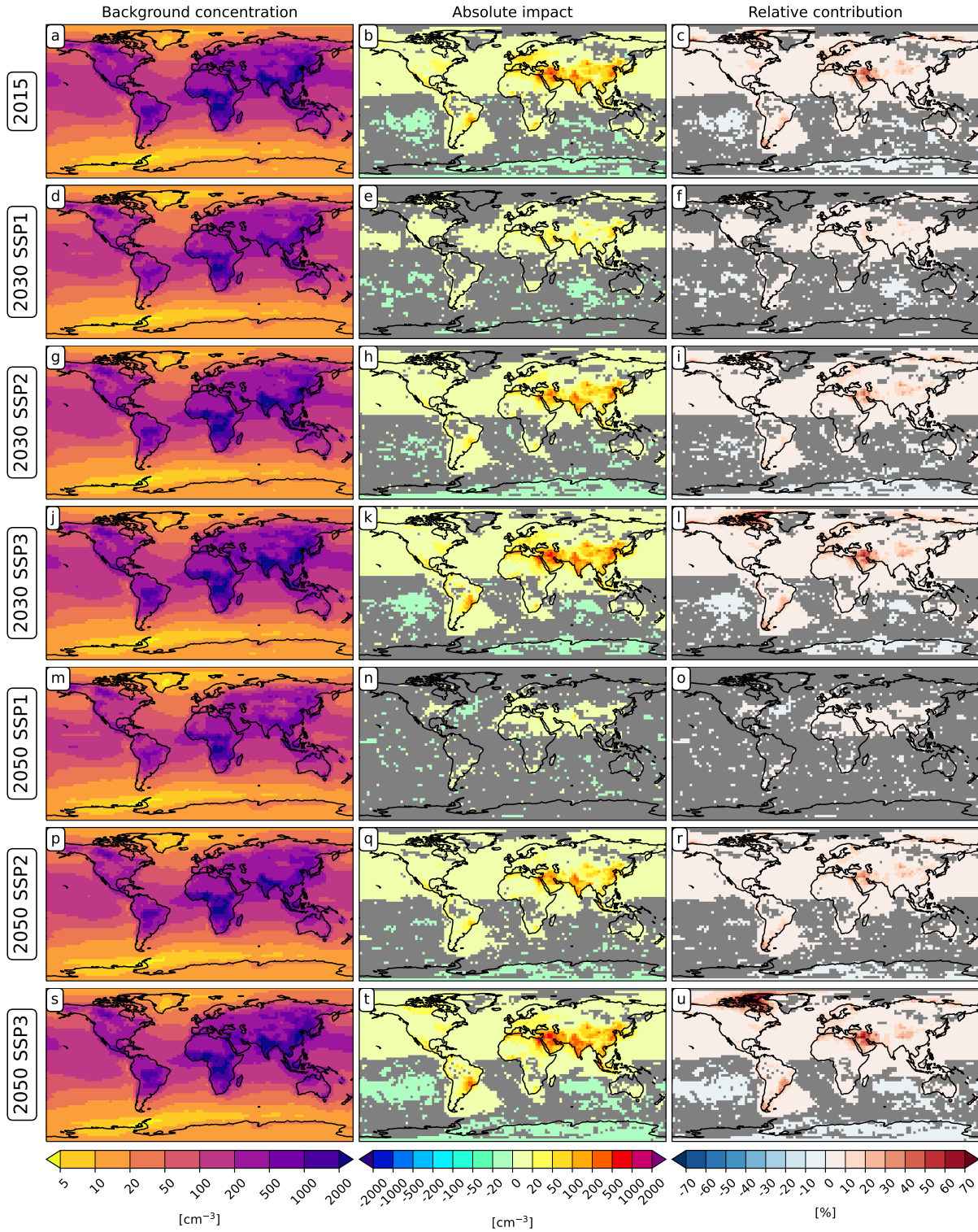


Figure S6: Land transport impact on surface-level accumulation mode particle number concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

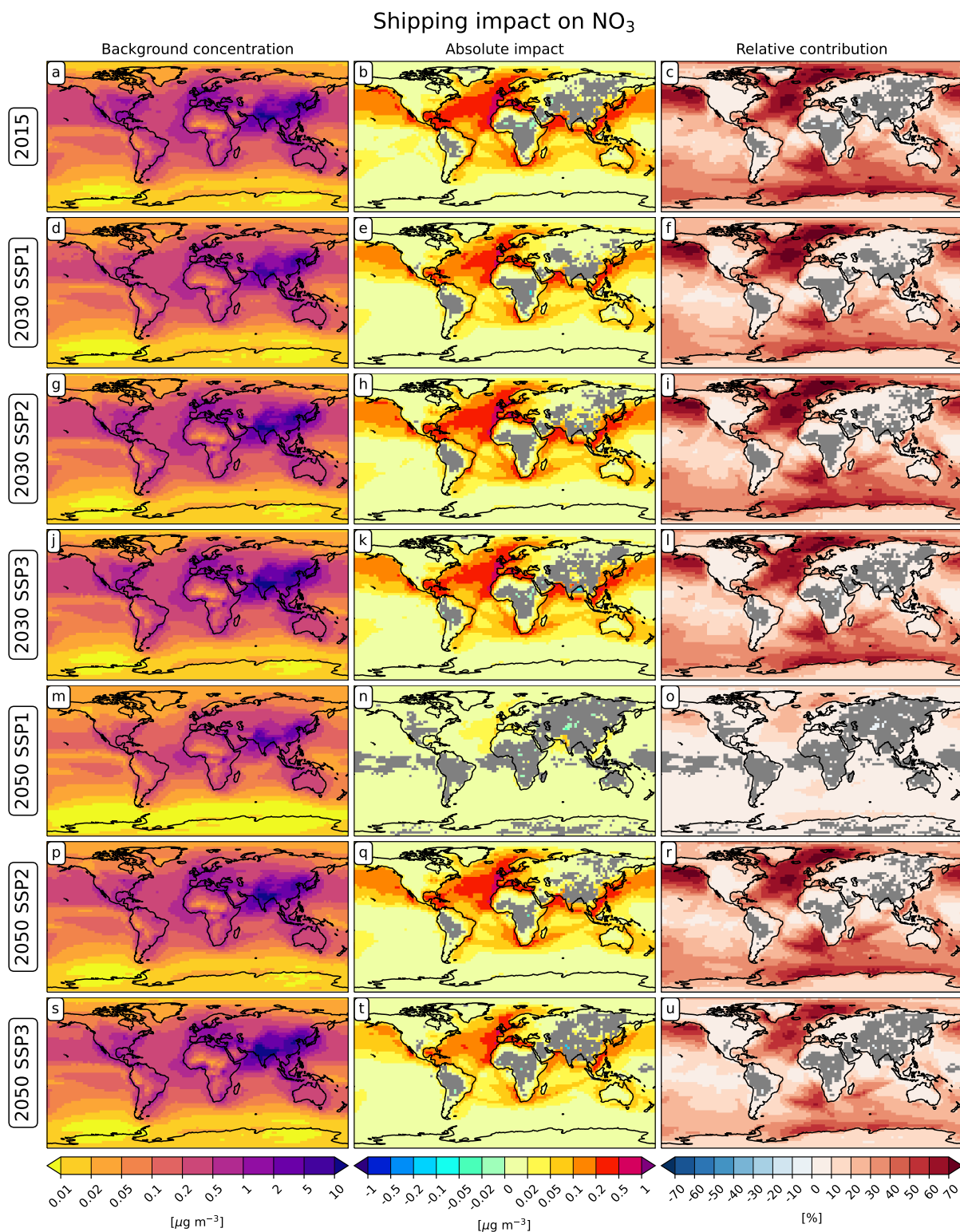


Figure S7: Shipping impact on surface-level NO₃ concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

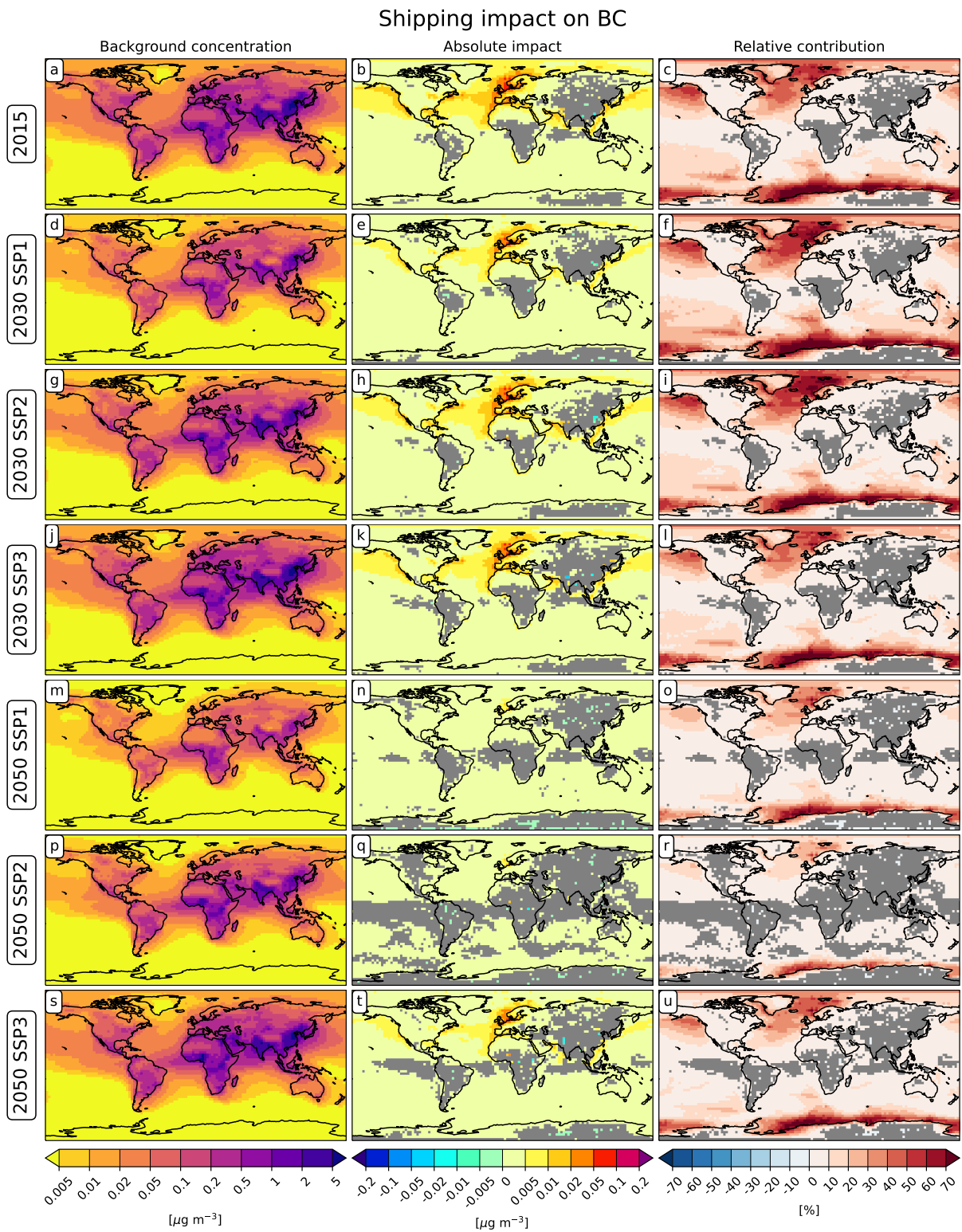


Figure S8: Shipping impact on surface-level BC concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

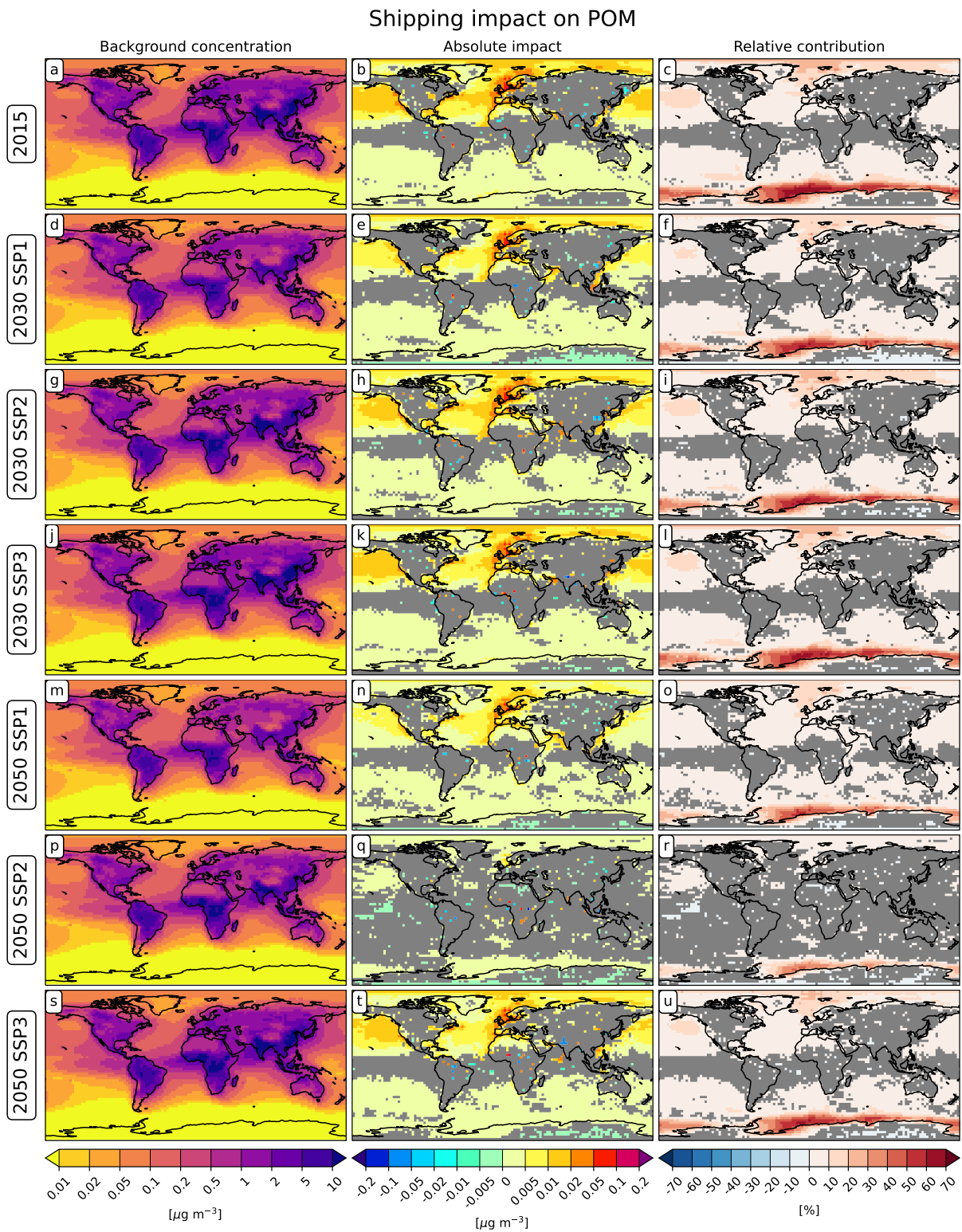


Figure S9: Shipping impact on surface-level POM concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

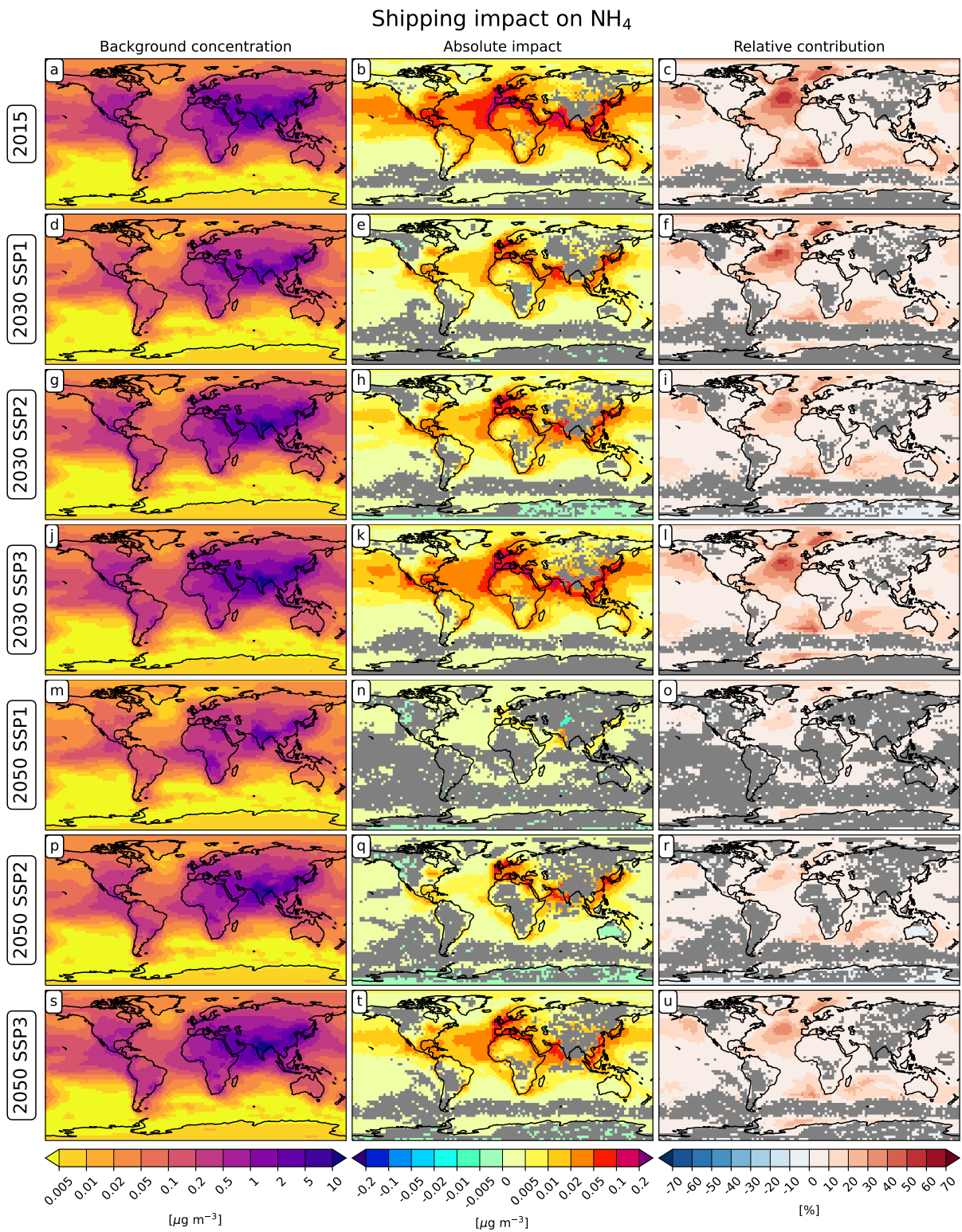


Figure S10: Shipping impact on surface-level NH₄ concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

Shipping impact on particle number (Aitken mode)

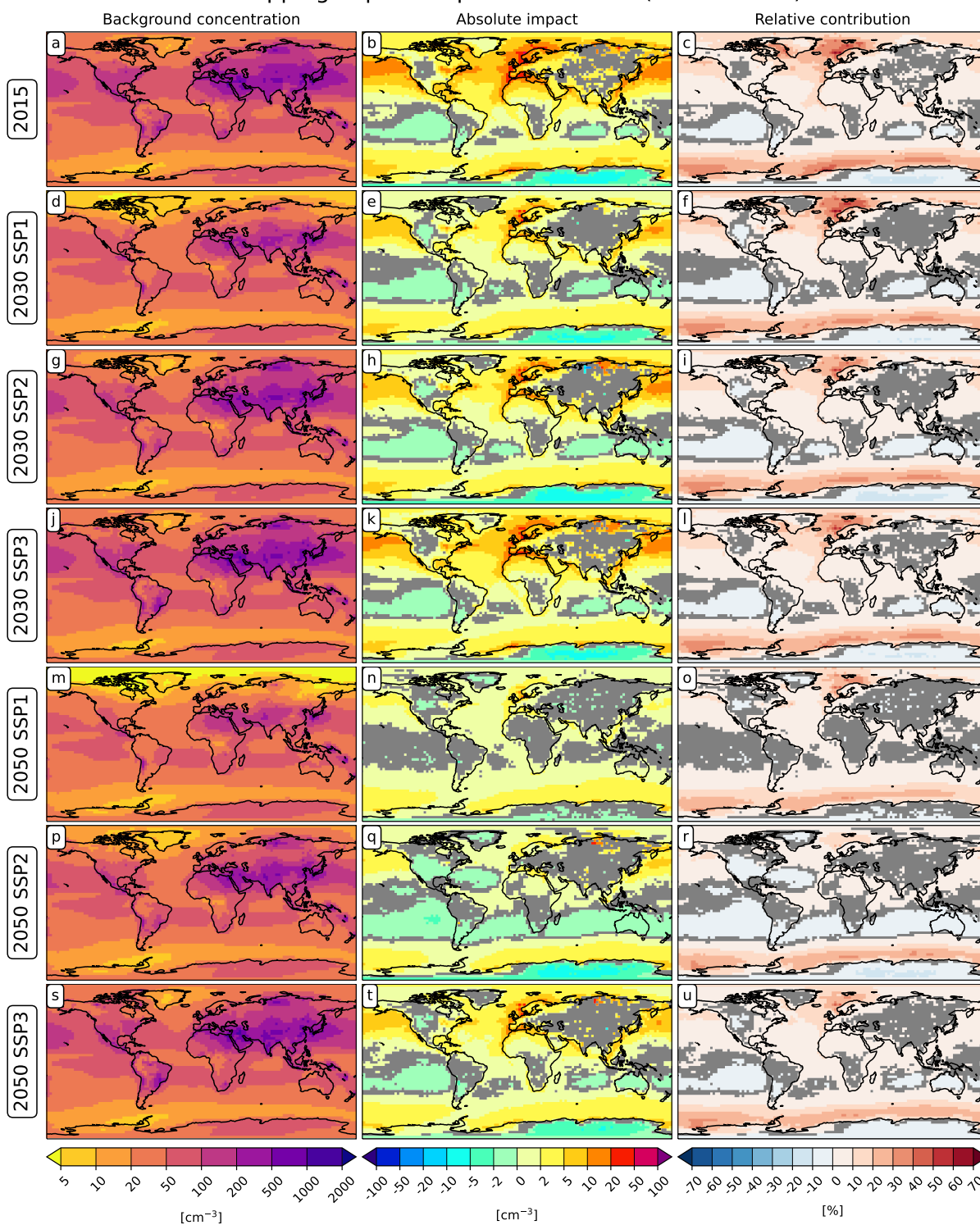


Figure S11: Shipping impact on surface-level Aitken mode particle number concentration. The left panels show the background particle number concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

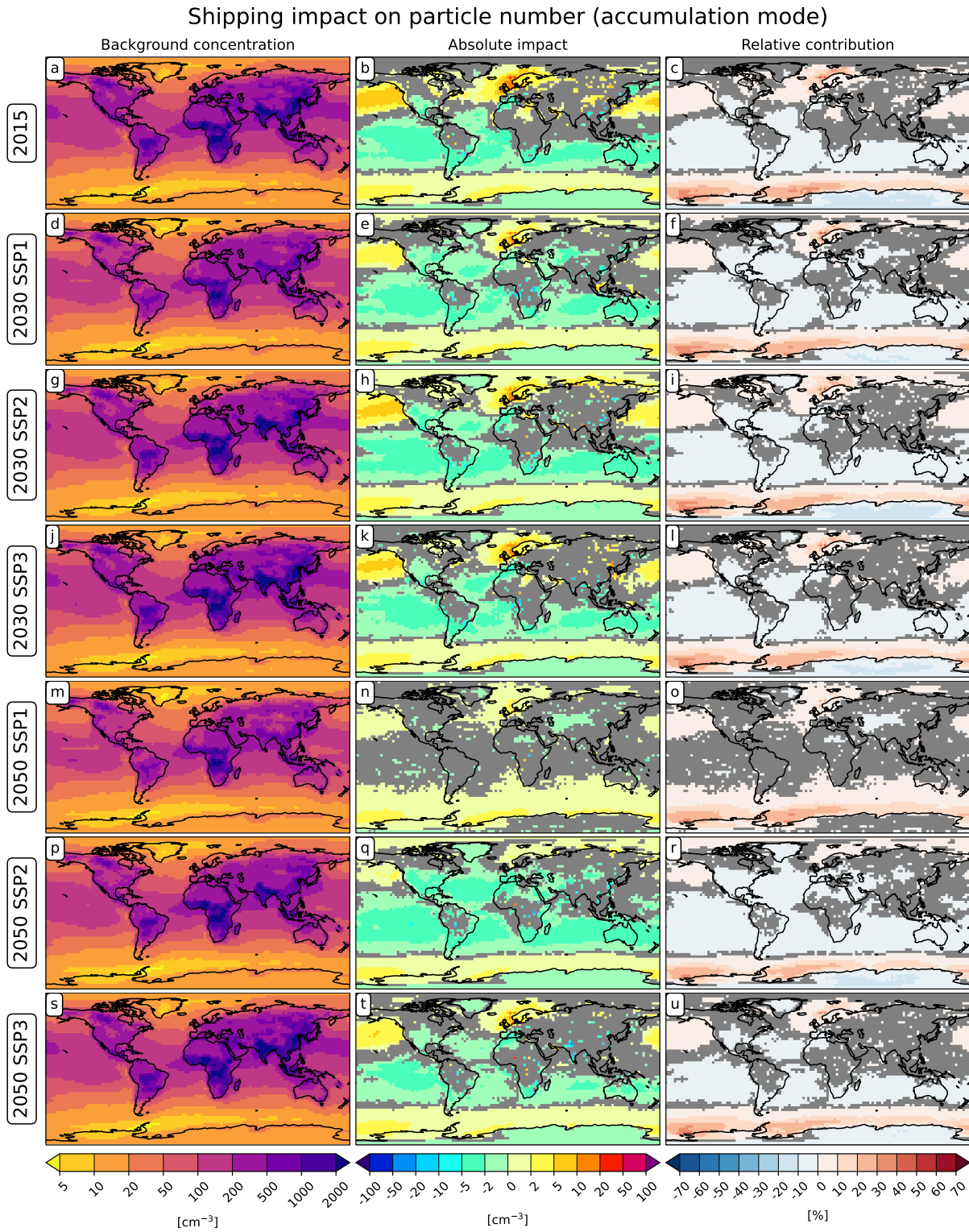


Figure S12: Shipping impact on surface-level accumulation mode particle number concentration. The left panels show the background concentration for reference. The middle and right panels show the land-transport-induced absolute impacts and the relative contributions, respectively. Grid points where the impacts are not significant to a 95% confidence level are masked out in gray.

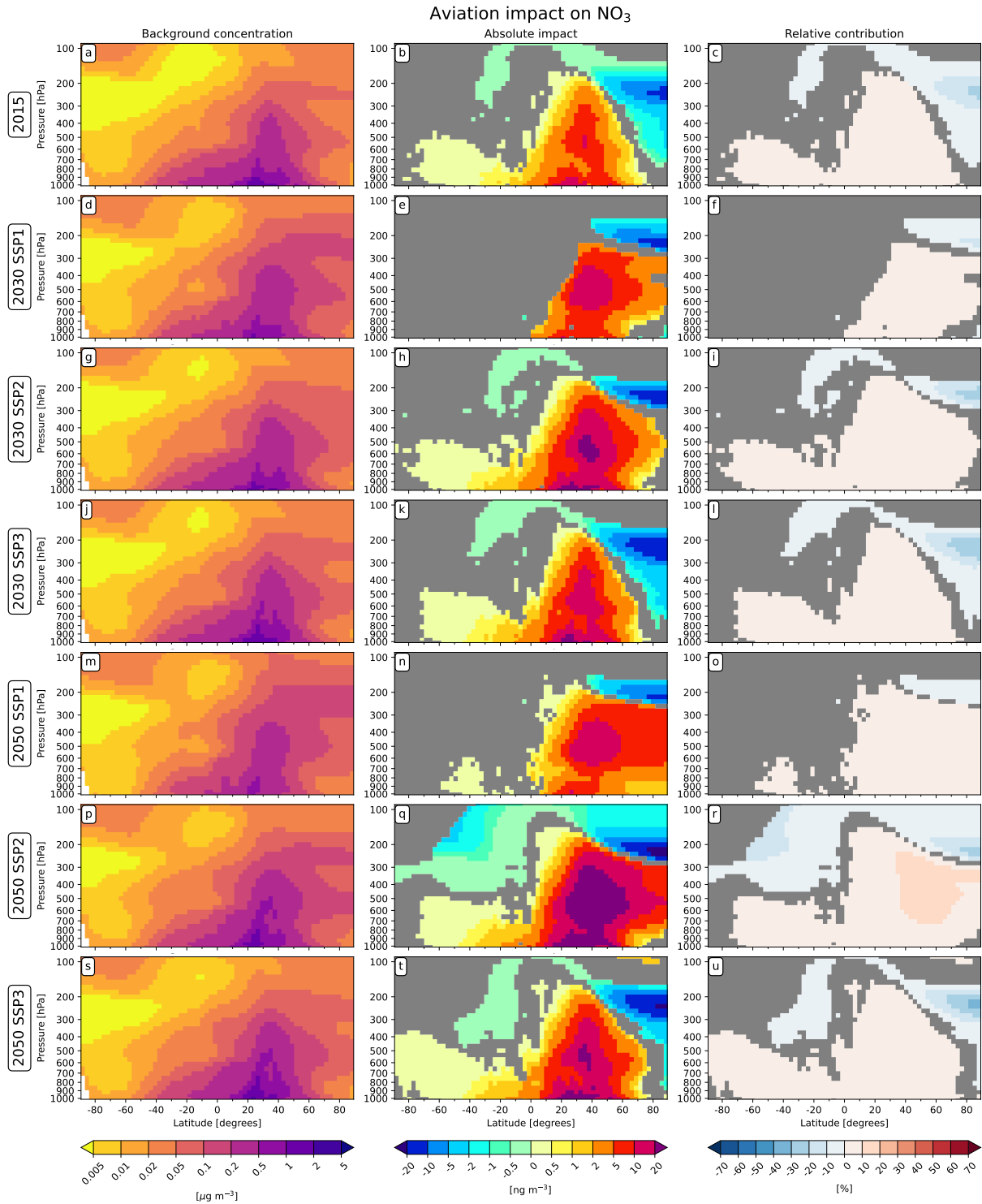


Figure S13: Aviation impact on zonally averaged NO₃ concentration. The left panels show the absolute changes, while the right ones show the relative contribution. Grid points where the differences are not significant at a 95% confidence level are masked out in gray. Note that, in contrast to the other figures, the units of the absolute changes are nanogram per cubic meter.

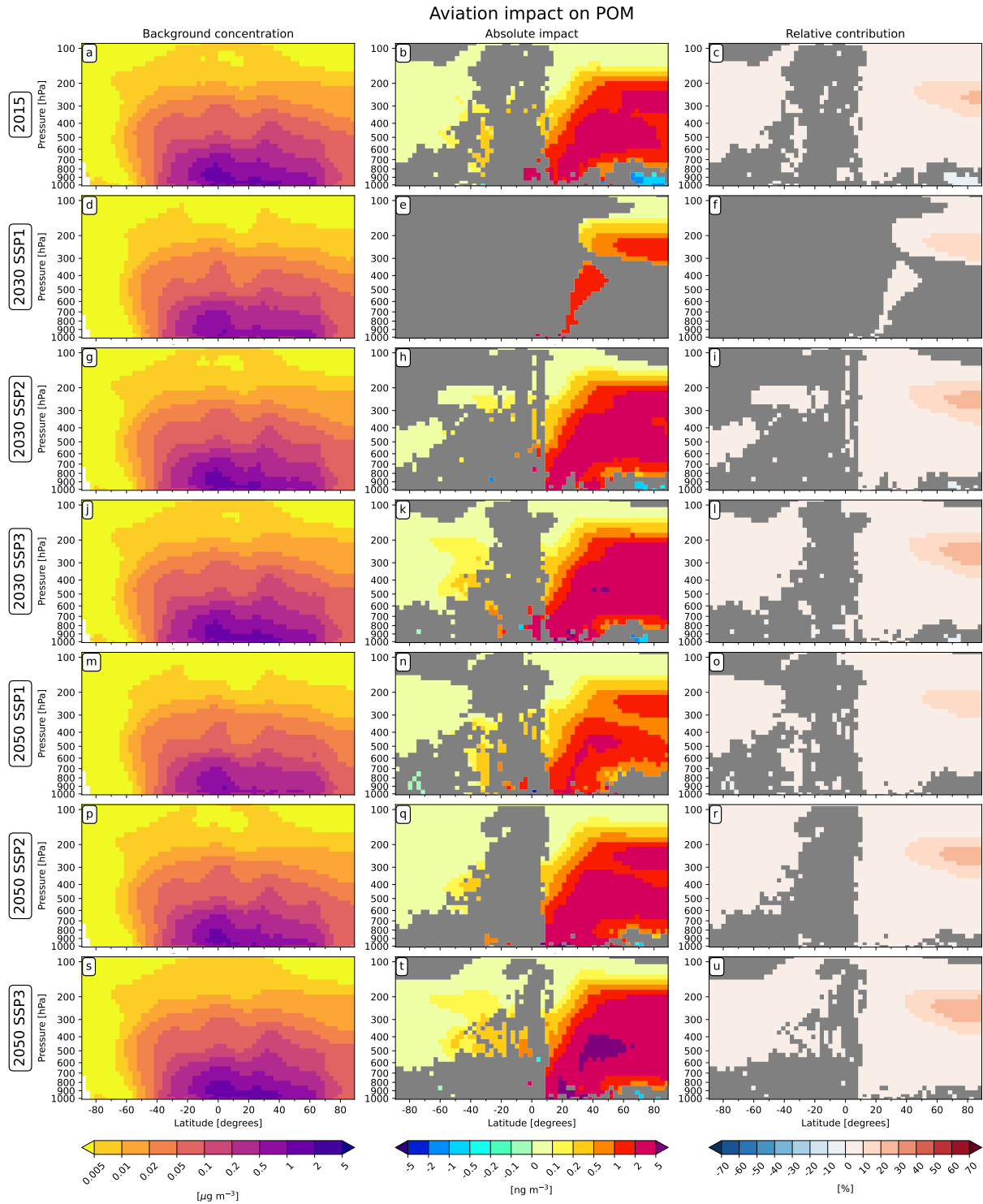


Figure S14: Aviation impact on zonally averaged POM concentration. The left panels show the absolute changes, while the right ones show the relative contribution. Grid points where the differences are not significant at a 95% confidence level are masked out in gray. Note that, in contrast to the other figures, the units of the absolute changes are nanogram per cubic meter.

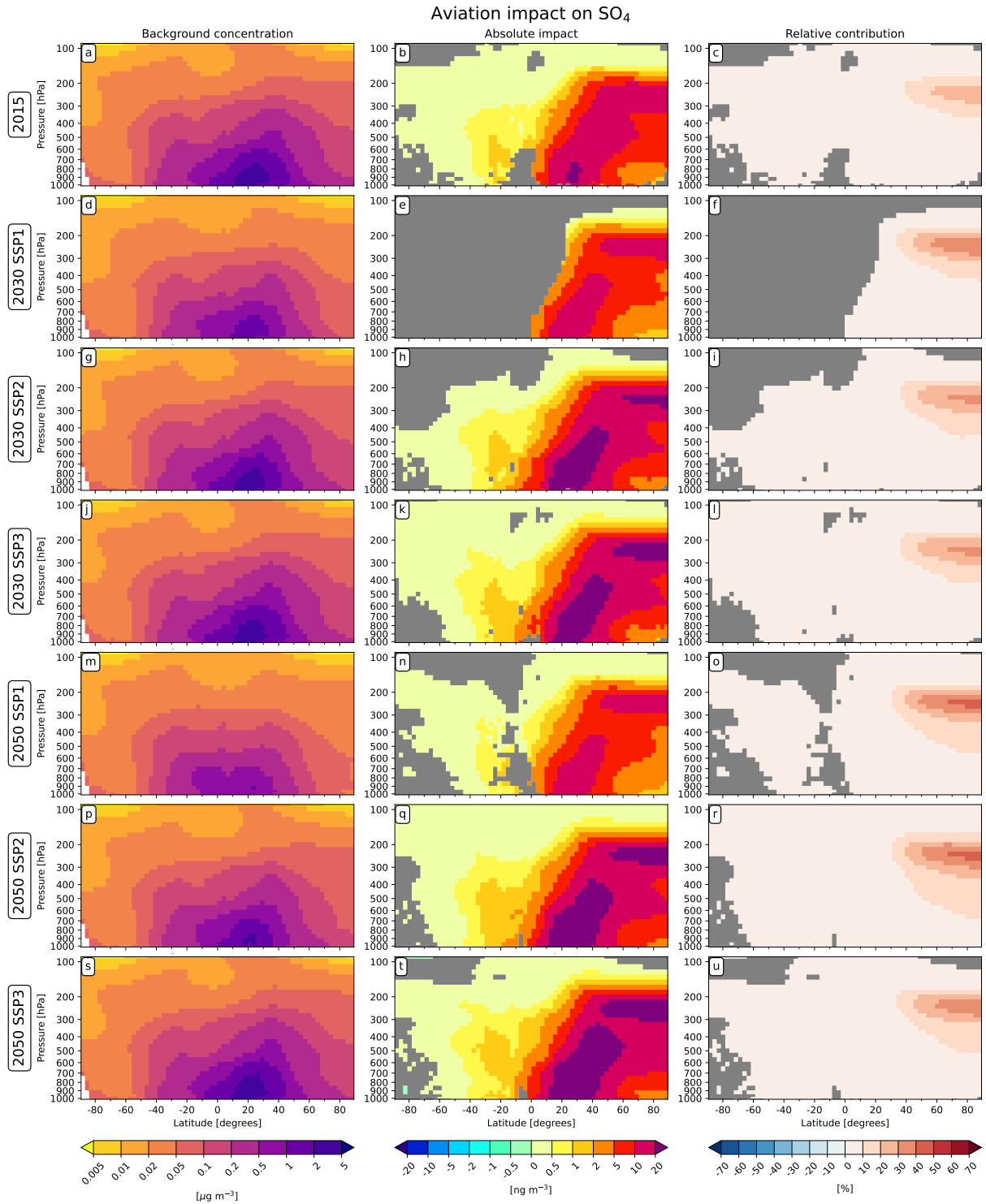


Figure S15: Aviation impact on zonally averaged SO₄ concentration. The left panels show the absolute changes, while the right ones show the relative contribution. Grid points where the differences are not significant at a 95% confidence level are masked out in gray. Note that, in contrast to the other figures, the units of the absolute changes are nanogram per cubic meter.

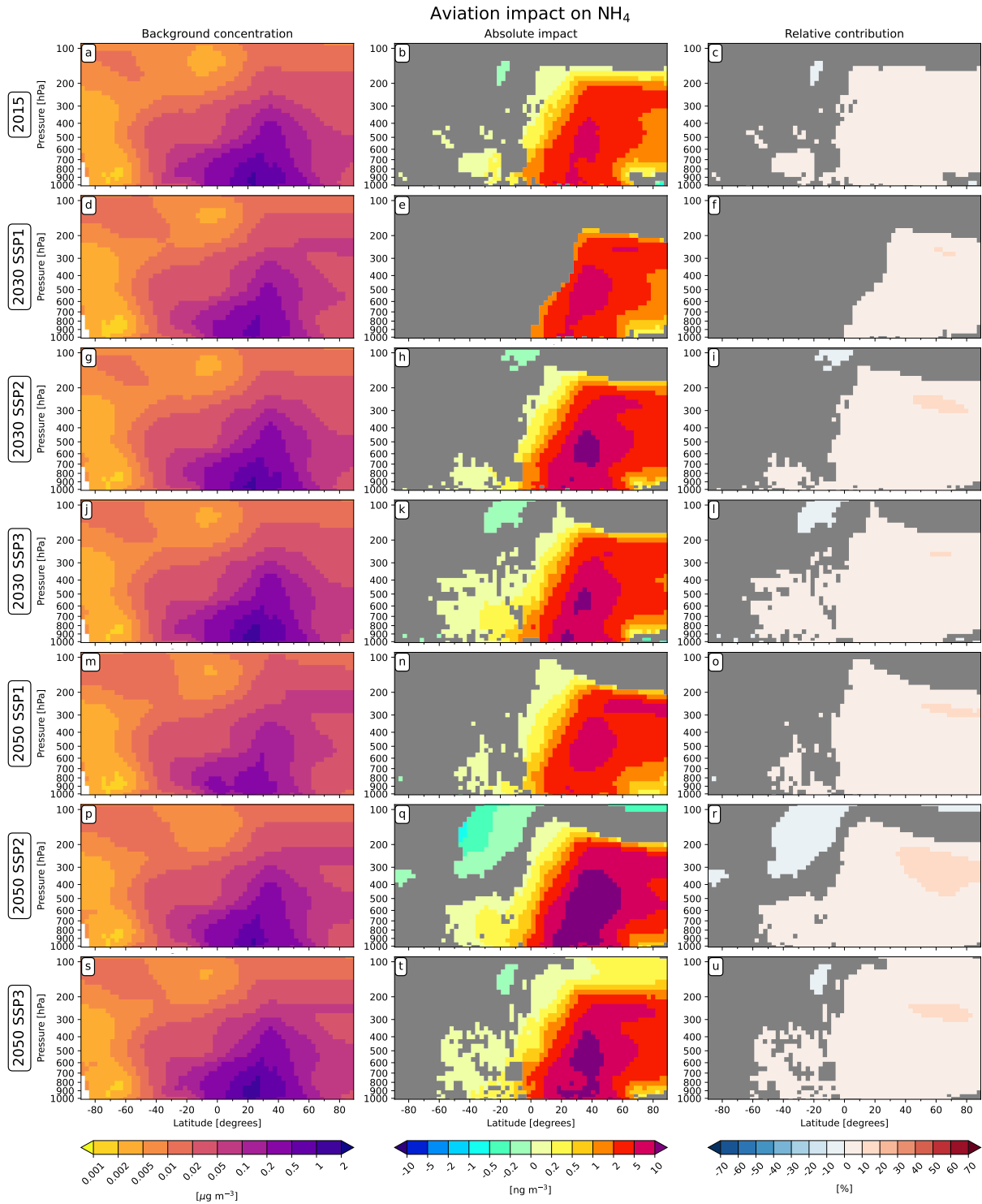


Figure S16: Aviation impact on zonally averaged NH₄ concentration. The left panels show the absolute changes, while the right ones show the relative contribution. Grid points where the differences are not significant at a 95% confidence level are masked out in gray. Note that, in contrast to the other figures, the units of the absolute changes are nanogram per cubic meter.

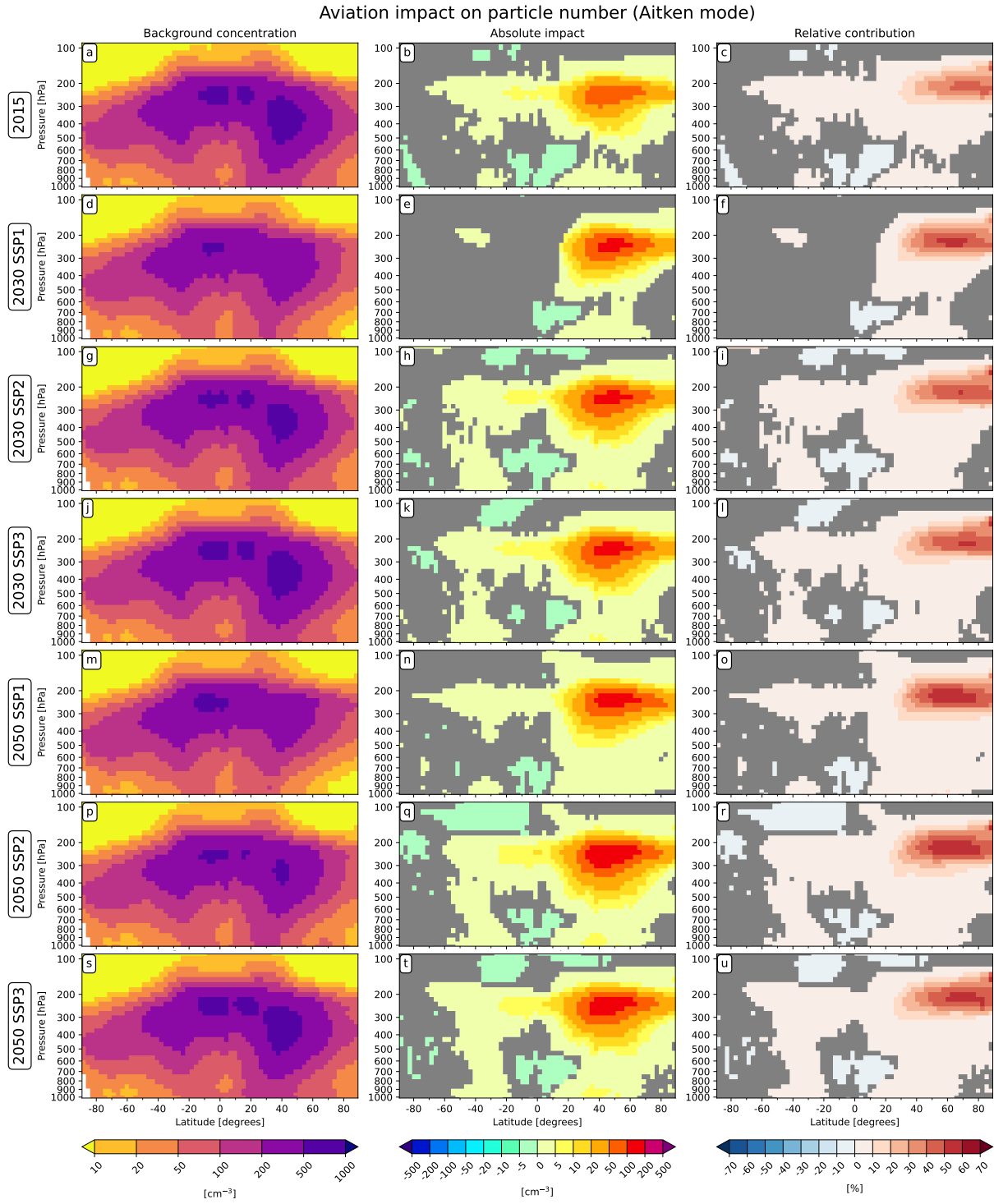


Figure S17: Aviation impact on zonally averaged Aitken particle number concentration. The left panels show the absolute changes, while the right ones show the relative contribution. Grid points where the differences are not significant at a 95% confidence level are masked out in gray. Note that, in contrast to the other figures, the units of the absolute changes are nanogram per cubic meter.

Aviation impact on particle number (accumulation mode)

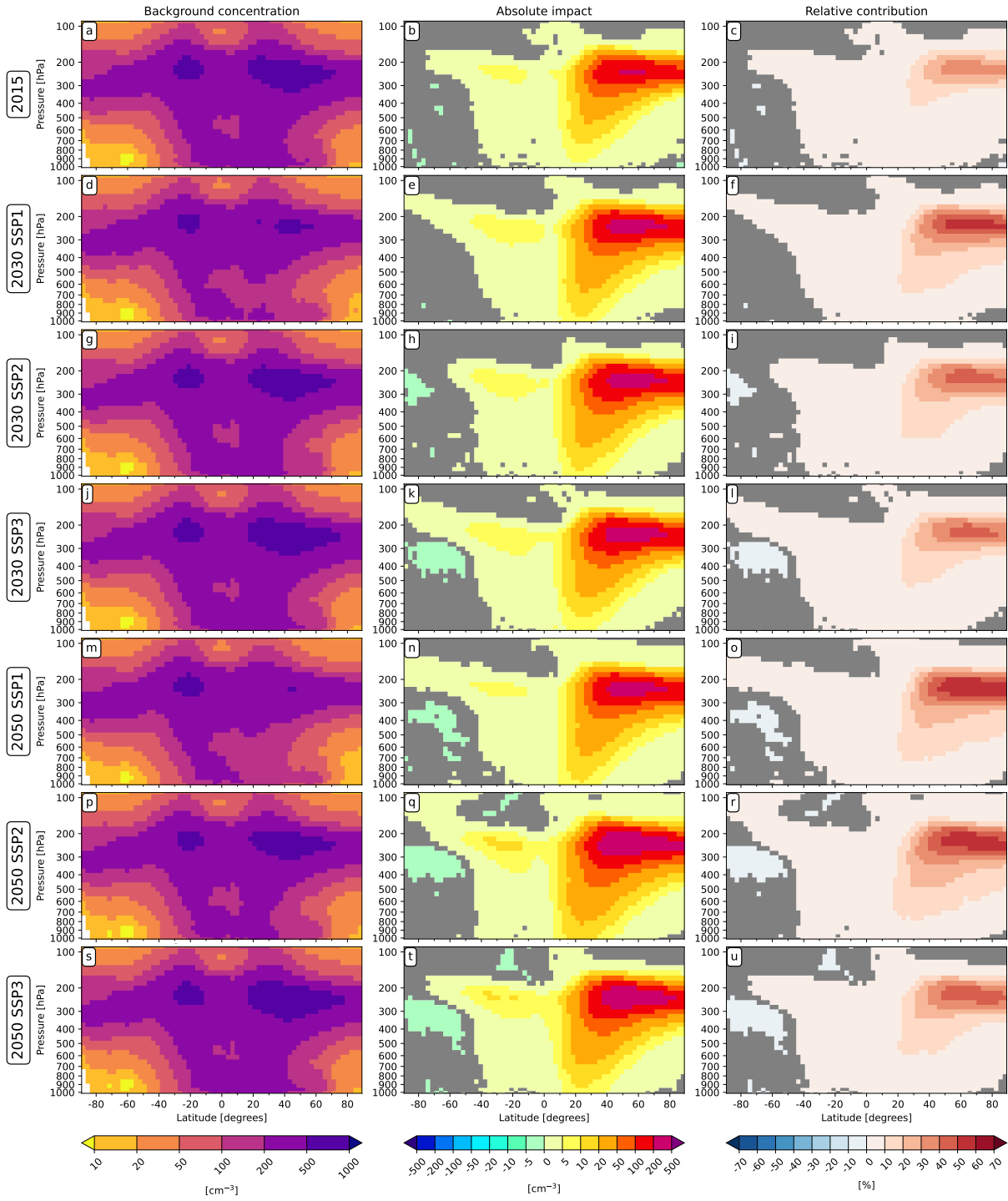


Figure S18: Aviation impact on zonally averaged accumulation mode particle number concentration. The left panels show the absolute changes, while the right ones show the relative contribution. Grid points where the differences are not significant at a 95% confidence level are masked out in gray. Note that, in contrast to the other figures, the units of the absolute changes are nanogram per cubic meter.

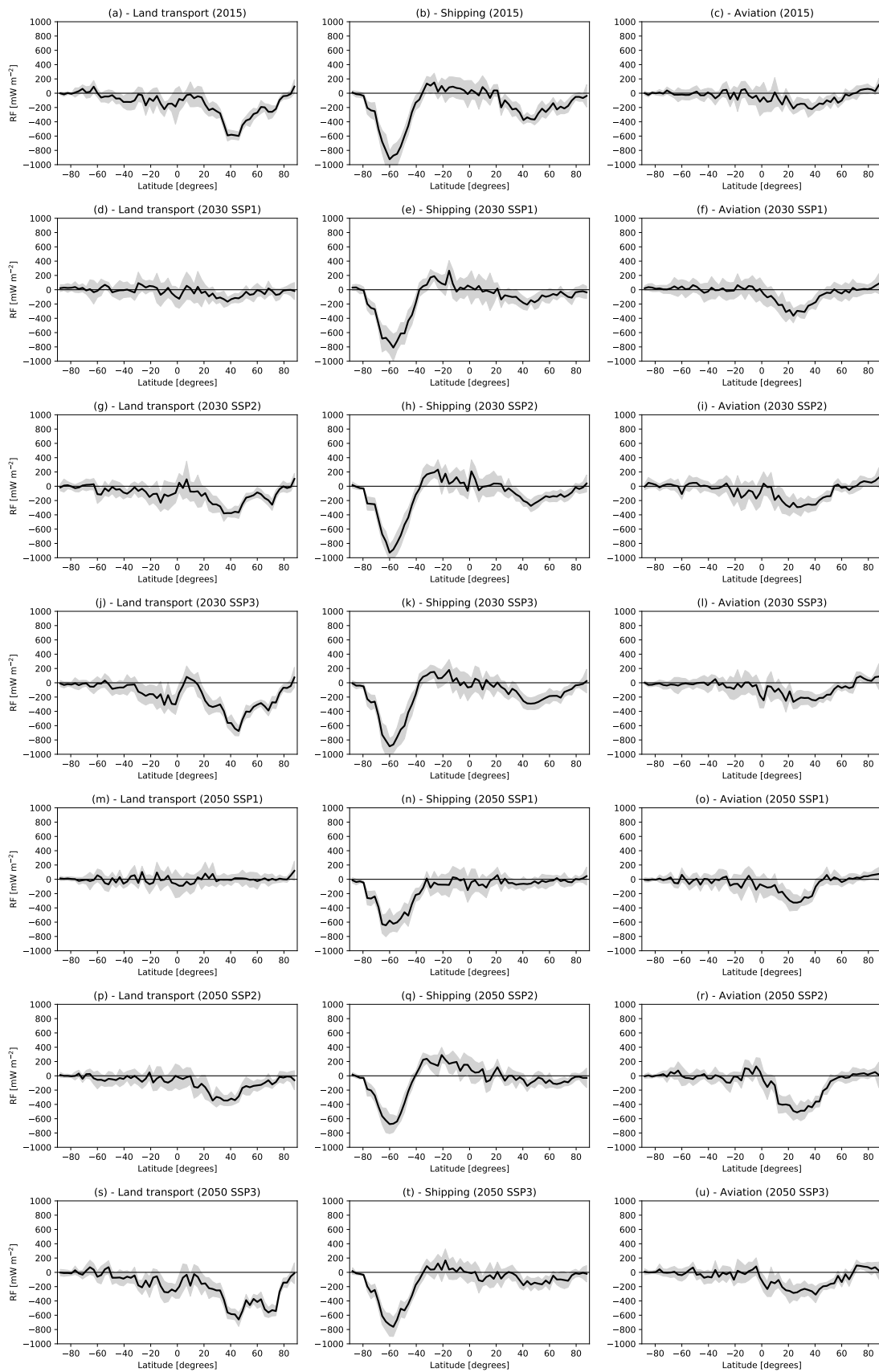


Figure S19: Zonal mean all-sky RF of land transport, shipping and aviation in the year 2015 and for the three SSP scenarios in 2030 and 2050. The shaded areas represent the 95% confidence interval.