

Publication**Export of ice-nucleating particles from watersheds: results from the Amazon and Tocantins river plumes****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 4665629**Author(s)** Einbock, Annika; Burtscher, Emma; Frey, Claudia; Conen, Franz**Author(s) at UniBasel** [Conen, Franz](#) ;**Year** 2023**Title** Export of ice-nucleating particles from watersheds: results from the Amazon and Tocantins river plumes**Journal** Royal Society Open Science**Volume** 10**Number** 2**Pages / Article-Number** 220878**Keywords** ice-nucleating particles; river plume; Amazon; Tocantins; watershed; atmosphere

We examined ice-nucleating particles (INPs) in the plumes of the Tocantins and Amazon rivers, which drain watersheds with different proportions of degraded land. The concentration of INPs active at -15 degrees C (INP-15) was an order of magnitude lower in the Tocantins (mean = 13.2 ml(-1); s.d. = 7.8 ml(-1)), draining the more degraded watershed, compared with the Amazon (mean = 175.8 ml(-1); s.d. = 11.2 ml(-1)), where the concentration was also significantly higher than in Atlantic surface waters (mean = 3.2 ml(-1); s.d. = 2.3 ml(-1)). Differences in heat tolerance suggest that INPs emitted by the Amazon rainforest to the atmosphere or washed into the river might originate from contrasting sources on top of and below the rainforest canopy, respectively. For the Amazon River, we estimate a daily discharge of 10(18) INP-15 to Atlantic waters. Rivers in cooler climate zones tend to have much higher concentrations of INPs and could, despite a smaller water volume discharged, transfer even larger absolute numbers of INP-15 to shelf waters than does the Amazon. To what extent these terrestrial INPs become aerosolized by breaking waves and bubble-bursting remains an open question.

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