

Lead isotopes track exposure of Amazonian wildlife to oil spills

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Up to 30% of the world's rainforests overlap with conventional oil and gas reserves, being the Amazon one of the tropical rainforests with the highest percentage of overlap. The area leased for oil exploration and exploitation in the Peruvian Amazon peaked in 2010, where only 13 national parks and sanctuaries (<10% of the Peruvian Amazon) are strictly off-limits to extractive activities for oil and gas. The first oil activities in the Peruvian Amazon began more than four decades ago, and have generated a long-standing socio-environmental conflict. Thus, the spillage by accident, or during regular operational activities, of oil and formation or produced water (PW) was commonplace until 2010, and still is relatively frequent nowadays.

PW sprouts along with oil and amounts to 70% of the average volume of fluids produced by an oil well. It is highly enriched in salt and heavy metals, and land areas affected by spills are frequently visited by fauna according to reports from local indigenous communities. One of the aims of the project is to determine whether species of game hunted by local communities, as part of their subsistence diet, do indeed ingest oil contaminated soil and water, and have abnormal levels of heavy metals in their organs.

By means of an extensive camera trap program we have collected multiple visual evidence that local game do regularly ingest soil and water in areas affected by spills. We have also collected tissue samples from animals hunted in polluted areas, as well as from control areas that are distant from any oil infrastructure, and analyzed their Pb isotopic signatures, and contents of other heavy metals. Our results show that control livers samples share a unique source of Pb that we argue to be from local soils, while livers samples from areas close to oil extraction infrastructure have multiple sources of Pb. Our findings suggest that in remote regions of the Amazon, oil extraction activities are a significant source of Pb in the animal livers obtained from wild game hunted in the oil concession blocks.