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Expanding the coverage of ecosystem services in life cycle assessment: an interdisciplinary venture

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Expanding the Coverage of Ecosystem Services in Life Cycle Assessment

An interdisciplinary venture

Elizabeth Migoni Alejandre

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Preface

At the beginning of every PhD journey, there are several questions awaiting to be answered. There are those questions mold by the researcher in training, the PhD candidate along with their supervisors and team, and, in other instances, questions that arise at different stages of development in the life of a researcher. The origins of the questions we tackle, are all rooted in a desire to understand the reality that surrounds us, an attempt to explain it, or at least, to envision a way in which we can actively describe and influence the elaborated mantelpiece of facts and conjectures we witness while doing science. In my case, the questions that led to the start of this journey to become a trained researcher on environmental sciences, came in the middle of the Caribbean Sea, while volunteering in an oceanographic research cruise where physicists and oceanographers had begun modelling underwater currents to help provide information on the possible extent of the disastrous Deepwater Horizon oil spillage, where an estimated amount of 780,000 m^3 of crude oil leaked to the sea.

By the time I enrolled as volunteer for this research cruise, I had been majoring in Biology. My specialization track had been biomedicine, and while training at the immunology lab, the amount of time I was spending looking through microscope and tubes had become larger than the time I had spent looking out the window. Despite the unhealthy sleeping and eating habits of most of those who work full time in a biology lab, I was satisfied with the job I was doing, studying the different mechanisms the body uses to heal itself, and the ways we can engineer molecular and cellular systems to help us in the fight against yet unconquerable diseases. Working in biological labs involves not only training on specialized techniques, but also on safety procedures and guidelines. One night staying until late at the lab waiting for a sample, I started wandering around the isles, looking at the labels on all the different bottles and containers we regularly used. The black and red labels, all indicating different effects and risks associated with the substances inside, carcinogenic, mutagenic, toxic. It is not only important to know how to handle these substances, but it is of even higher importance to know how to dispose of them in a safe manner. The questions arose in my mind after contemplating at these labels: *What happens to all this waste, where does it end if disposed carelessly?* Skepticism or simple realism, but it

was hard for me to believe that all these heavily toxic and pollutant materials were correctly dealt with in my country, let alone all around the world. How much work in the lab trying to cure a disease could compensate for all the unintended consequences of the instruments we use and their collateral damage? The question remained unconsciously in a corner of my mind. As a stone in the shoe, I kept walking without putting too much thought on it. After all, I was focused on another task, one that I could address with the tools and studies I had chosen.

The vacancy for a paid volunteer job in an oceanographic cruise came as gift of destiny, through people I knew and at a time when both the experience and money were highly welcomed. That summer, I bought hard shell boots and packed my bags to spend more than 4 weeks ashore cruising on a research boat, helping with the small tasks onboard and cleaning measuring instruments that were extracted back from the ocean for maintenance and collection of data. Spending weeks out in the ocean has been one of the most fascinating experiences of my life, not only for the opportunity of seeing the Caribbean Sea blur its horizon line with a red scarlet sky, but also for the opportunity of being confronted once again with a question that had come to me before, and to which I had, partly, closed the door due to lack of experience and, I must admit, courage.

The Deepwater Horizon oil spillage was one of the largest documented disasters of recent times. Millions of gallons drained out of wells, thousands of animals washed ashore covered in black sludge. By the time of the spill, the only information that could help determine how far the spill could go and which potential routes it would take, were the studies from an oceanographic research group from Baja California that had been developing a numerical model to describe underwater currents in the Caribbean Sea. With an ecological disaster at hands, the funding for this research group increased to aid the strategies that would be put in place to attempt remediation and future prevention. The intersection of oceanographers, physicists, and many other disciplines involved in the project, were a first glimpse for me on the importance of interdisciplinary collaboration, and it woke up a question that was closely related with that old stone in my shoe: What if we could prevent, or at least attempt to foresee, with the same amount of strength in collaboration, the unintended consequences of our practices, and the risks to which we submit ourselves, and our surroundings?

To my mother, Amelia.

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