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The Harmony of the Abyss – Revealing the aesthetics and tempo of the mutation of deep ocean geological processes and their links to hydrothermal vents and associated life

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The study of the geological processes associated with the formation of the ocean floor is fundamental to understand hydrothermal systems in terms of genesis, evolution, duration, cyclicity and spatial distribution as well as the colonization of these systems by living beings. In this project, we will use music to communicate about these processes to the public.

The ocean floor is constructed by the interaction in time and space of three major processes: volcanism, tectonics and hydrothermalism. This last process is fundamental in the cooling and transformation, through the alteration of rocks, of the oceanic floor. Finally, sedimentation gradually covers the floor constructed by these three processes. Instabilities and landslides will affect the sedimentary cover and volcanoes and thus modify the underwater landscape. Time is fundamental when studying these processes. The ocean floor is constantly changing. Eruptions occur suddenly, last a few hours or extend over several days. A fault can rupture, producing earthquakes which may cause major landslides. All of these processes have a direct impact on the distribution and dynamics of hydrothermal circulations. An earthquake can open new fractures allowing seawater to penetrate into the crust, creating new vents. Another earthquake or volcanic eruption can seal these circulation paths, leading to the cessation of the outflow of fluids and the death of the associated ecosystem. The lifespan of a hydrothermal site is therefore strongly dependent on this dynamic. In this dynamic landscape, organisms evolve, move, colonize chimneys, multiply and eventually disappear when the fluid output stops. It is this constant mutation, on variable time scales, ranging from a few years to a few tens of thousands of years, that we wish to transcribe into music.

Over the years, our team built an immense collection of images of the ocean floor and hydrothermal vents. These documents are rarely released to the general public. When exposed,

they often speak little because even if the images are beautiful and impressive, the processes and time scales behind them are difficult to grasp. The idea of this project is to create a musical piece telling the stories of the formation of the ocean floor and of hydrothermal fields, on different time scales. We will tell a story of a changing landscape, of the creation of oases of life, from their beginning until the death of the colonies. We will interact with the composer through videos and images, accompanied by explanations of the processes. The exchanges allow the composer to explain his musical choices which will be his way of perceiving these complex developments. The production of this piece will be entrusted to the orchestra of the University of Brest. Here too, the interaction between researchers and the musicians is at the heart of the project. Discussions and scientific explanations of the images will accompany the musical work. The work will therefore be the result of group construction. It will be presented during the university Art & Science festival and during scientific events or maritime festivals.