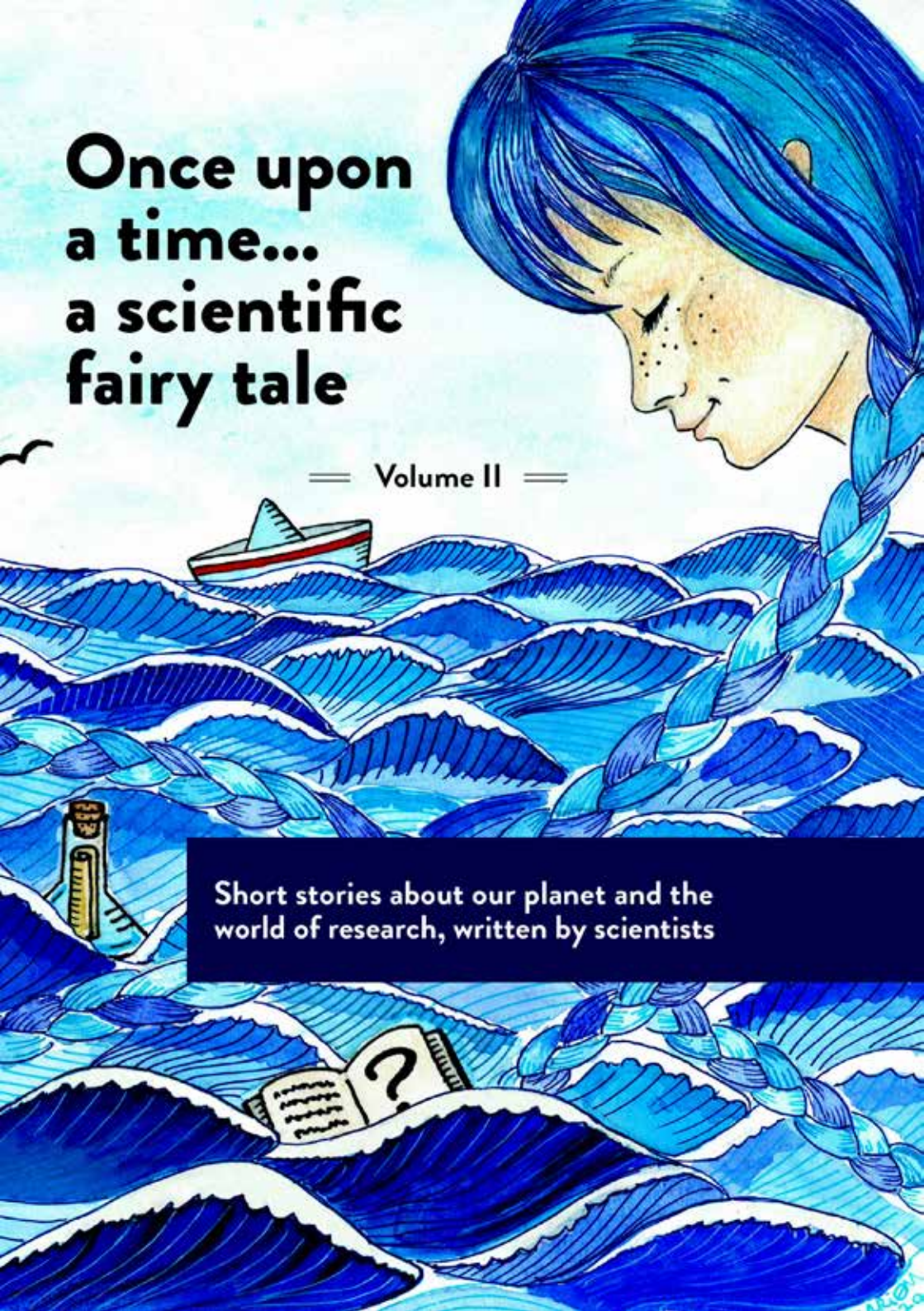


# Once upon a time... a scientific fairy tale

== Volume II ==

A young girl with long, vibrant blue hair styled in a thick braid is shown in profile, looking down with a gentle smile. Her hair is the same color as the sea below her. The sea is composed of waves that are intricately braided, mirroring her hair. In the distance, a small white boat with a red stripe is visible on the horizon. In the foreground, a yellow thermometer-like device is partially submerged in the waves, and an open book with a question mark on its cover floats nearby. The overall scene is a whimsical blend of nature and science.

Short stories about our planet and the  
world of research, written by scientists

'What place would you advise me to visit now?' he asked.  
'The planet Earth,' replied the geographer.  
'It has a good reputation.'

The Little Prince  
Antoine de Saint-Exupéry

Several scientists will accompany you on the journey.

# Once upon a time...

a scientific fairy tale

Vol II

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# Once upon a time, there was a brave young girl

She shouted aloud for all to hear: 'We have to start treating the crisis like a crisis—and act even if we don't have all the solutions.' 'Listen to the scientists!' She went on strike from school, marched through the streets proclaiming her message and fearlessly faced and challenged world leaders. Her actions inspired children and adults all over the world to take to the streets, to social media and to their local communities to voice their own concerns regarding the climate crisis and the future of society on our planet.

These profound actions and the simple message of the young climate activist Greta Thunberg created a new viral platform, bringing people together to counteract the advancing global warming. Although major actions against human-made climate change, overexploitation of resources and pollution are still to be taken, and it will take a long time before their environmental benefits become visible, collective acts of public education and demonstrations about the climate crisis across the globe are a sign that the population is ready for them and willing to make them happen.

The 'Once Upon a Time' team was founded in 2016 by a group of scientists who want to be listened to. Scientists who want to transfer knowledge as entertainingly and comprehensibly as possible without compromising on accuracy or scientific precision. In 2017, we published a first volume with stories about the threats that the Earth is facing and the amazing secrets it holds for us. The current lust for knowledge and action in environmental matters now provides the perfect backdrop for the launch of our second volume packed full with new fun and factual tales.

Immerse yourself in these stories and scientific facts about our planet and its inhabitants and share them with others. Take a dive with Ollin and Phoenix to the bleaching coral reefs or dive much deeper to the deepest place in the ocean—the Mariana Trench—on a thrilling voyage. Read Earth's own telling of its history and let the beautiful scarlet birds of

Brazil tell you about their unique home: the mangroves... These are just some of the intriguing tales waiting to be discovered within these pages. As you learn more about our amazing planet and your role in everything, consider what actions you and your family can take to protect our planet—our home—and to ensure a good future for every living creature on it. You can find some of those actions in this volume and many more in volume I.

We hope you have a wonderful journey!

*Hadar Elyashiv & Gema Martínez Méndez*  
on behalf of the whole team  
Bremen, 11<sup>th</sup> February 2021

# My life, your life



Rodrigo da Costa Portilho Ramos and Sonja Böske da Costa

**Illustrations:** Yuly Lorena Allende

**A**llow me to introduce myself—I am the Earth, the beautiful blue planet on which you live.

Today, I am going to tell you a little bit about the story of my life, which will hopefully also help you to understand more about who you are and how the world around you developed. I will be talking about evolution and I will also explain how your life and mine are intertwined and why right now I need some help—YOUR help!

Let me start at the very beginning. They say that everything—including space and time—was created about 13.8 billion years ago during an event called the Big Bang. I wasn't there to witness it because I was born a long time after it happened. My story begins 4.6 billion years ago and it begins with loneliness.

In the beginning, I was very sad and lonely because I was all alone. I was extremely hot with lots of active volcanoes spewing lava and toxic gases into the air. No rainwater could reach my surface because everything evaporated before even touching me. There was no oxygen either. To make things worse, I was being bombarded by thousands of meteors coming from space every day. Life could not exist; I was a very hostile environment for anything living. Just imagine—for millions and millions of years I was all alone... with no humans or other animals, no plants...to keep me company.

It took about a billion years for me to cool down and become less hostile. When I did, rain was finally able to reach my surface and water





started to accumulate in the first lakes, lagoons and oceans. Soon, life appeared in these new environments.

In the ocean, the first living organisms began to develop, the so-called microorganisms, which are really miniscule creatures comprising one cell. It is even possible that some of the new inhabitants originally arrived on the meteors that fell from space. I am actually not sure myself how it happened; I just know it was very important for me that it did happen!

At some point, small green algae began to grow in the ocean. These algae were able to produce and release oxygen into the water, and from there a lot of it escaped into the air. Over time, this oxygen accumulated and helped to form a new **atmosphere**, which was essential for the development of life outside the oceans. The presence of oxygen opened the door for the development of new life forms. It is what you use now to breathe and to live.

Almost 600 million years ago, the microorganisms evolved into larger

and more complex organisms. Soon the oceans were filled with more complex life.

Oh, sorry—when I say 'soon', I am thinking in my timescale. You do remember that I am 4.6 billion years old, don't you? So, a few million years for me are 'soon'.

So—what did that evolution actually look like? Well, imagine colourful fish swimming between rocky shores, jellyfish dancing all around, sharks swimming through the waters...it was absolutely beautiful!

Being beautiful is one thing, but, as you know, cleanliness is also important for staying healthy, too. Thankfully, there are animals such as mussels and clams which filter the seawater and act as 'cleaning staff' for the ocean. I am grateful that they exist, too.

But after that, the whole thing really started. Over millions of years, I witnessed so many beautiful developments in, on and above me. I was blessed to witness fish crawling from the sea and turning into amphibians. Then I watched these pioneers produce their first hard-shelled eggs. They later developed into the first lizards and snakes. At some point, life even conquered the air around me. The first flight attempts were still a little sluggish, but soon there were a lot of flying animals. I was absolutely thrilled.

Around that time, I was especially excited for another reason: there were many animals and plants that actually look quite similar to how they do today, only much bigger. For example, there were huge dragonflies about as big as present-day hawks. When these dragonflies flew from swamp to swamp, they helped to spread plant seeds. This allowed the huge lycopods (club mosses), horsetails and ferns to spread faster. Dense evergreen forests formed, covering mountains and valleys. Such forests offered good shelter for amphibians, which could sometimes grow up to six metres long. My life was amazing!

In all honesty, I can say that I was (and I am sure you will agree, still am) very pretty, colourful and full of life. And I was happy. Finally, no more loneliness: animals, plants, fungi and other organisms living



together in complete harmony for the most part. I was very healthy. Even though I was sometimes a little bit out of balance, I always had enough time to get used to the new circumstances.

Another very exciting time for me occurred around 200 million years ago. At that time, the largest land animals of all time ruled the Earth: the dinosaurs.

They existed in all shapes and colours: some were gigantic and slow, others were small and agile. Some had long necks, others had very short arms. Some of them could fly, whilst others decided to go back into the water and reclaim the ocean. Overall, everything looked very promising for the dinosaurs. But then, something happened that nobody had expected...

Suddenly, BOOOM, a giant meteor hit me, coming from outer space.



Forests burned, black smoke filled the skies and blocked the sun's rays. **Acid rain** polluted the oceans and killed almost everything that was alive. It reminded me of the hostile early years of my existence. So, for me, it was (almost) back to loneliness and sadness. I had experienced **mass extinctions** before, but this time everything happened so fast. My climate and my environment changed so quickly that it seemed impossible that organisms would have any time to adjust to the new conditions. I genuinely thought that life was coming to an end...

Imagine how happy I then was when I discovered that there were still some forms of life! For example, I noticed many small mammals living in caves and tunnels underground! Some fish and cold-water corals that lived in the deep dark sea had also survived. Soon the world of plants also recovered completely. From these survivors, a whole variety of life forms developed and a new era began.

From your point of view, almost nothing has ever happened really 'fast' in my whole history, but I was very surprised to see very varied and diverse fauna and flora only a few million years after the mass extinction of the dinosaurs.

I saw horses galloping around the plains, giant sloths eating fruits from the big trees, mammoths and sabre-tooth tigers roaming the forests. I saw your ancestors making fire, working with stones, crafting new tools and inventing the wheel. It was amazing and I loved hosting so many amazing developments.

I have just told you how animals and plants have been developing and changing on me over millions and millions of years. New climate and environmental conditions allowed the development and adaptation of older life forms into new ones better accommodated to the prevailing conditions. This is what is called 'survival of the fittest' in one of the most accepted theories in science. It means that only those best adapted to the environment survive and have babies to ensure future generations. Species which do not adapt to new environments go extinct sooner or later. However, if a species succeeds in adapting step by step, new species with new traits can evolve. In most cases, however, these steps take millions or at least thousands of years.

As you can see, my story is one of change. Changing environmental conditions are therefore by no means something 'bad' per se. On the contrary: they made me who I am today. However, it is also not about how much our environment changes, but about how quickly everything happens. You really don't have to worry about me. I know that I will recover from any change, sooner or later. The question is whether this will happen with or without you humans.

So far, only a few species have been able to change the living conditions on me. One example of such a living being are the algae which first produced oxygen and thereby dramatically changed the environment. However, this change happened over millions of years. It was a very slow process. Nowadays, humans are the ones who influence my environment the most. Everything is changing so fast that my head is spinning!

Change has sped up a lot since the invention of the steam engine. Humans have been using their intelligence to create new machines which continuously improve the quality of their lives. Please, do not get me wrong: innovations are great, and I am amazed at how the

human brain has developed and how humankind has come up with all of those smart things. However, many of these inventions at this point use **fossil fuels**. When the fuel is burned in an engine, it produces CO<sub>2</sub> and other gases, which are released into the atmosphere. These gases are also often referred to as greenhouse gases because they function similarly to the walls of a greenhouse, letting the solar rays in but preventing heat from escaping (this way plants in a greenhouse grow even when it is too cold for them outside).

Put simply: this greenhouse effect is the reason why I am getting hotter. The atmosphere around me is changing and this is changing my climate very, very fast. Millions of years used to be fast for me. Imagine now how I feel with this happening over a few centuries or even decades! I am overwhelmed! I have never yet seen any species change the conditions on me so quickly in my whole life.






Because of you, humans, I am experiencing a new mass extinction. If you do not modify your behaviour very, very soon, I am really frightened about experiencing a very dramatic one.

I am merely a planet; I have seen many different life forms come and go. There were dinosaurs and now there are humans prevailing on me. Perhaps in the future, I will host other life forms. It is nature's way of evolving. I know, I should not care, but I really like you guys and I would be happy to host you humans much longer.

Dinosaurs did not have a choice, their death was caused by an external event, but YOU can change your fate. The beautiful thing is that:

EACH AND EVERY ONE OF YOU CAN CONTRIBUTE EVERY DAY  
AND MAKE A CHANGE!

**Generally, make sure to use the resources on me, your planet Earth, with care. Act as sustainably as possible. There are so many ways to be more sustainable. Here are some ideas for what you can do:**

-  You could eat less meat, as mass animal production not only emits greenhouse gases but also uses a lot of water.
-  Save water. Take a shower instead of a bath. When you turn on the tap, collect the cold water until the water flow turns warm and use it to water your plants. Do not leave the water running while you brush your teeth.
-  Do not litter! When you go to the beach or walk in the street collect rubbish and put it into the bins provided. The environment will thank you—but be careful with sharp objects. Make sure not to hurt yourself and do not forget to wash your hands afterwards!
-  Rethink the way you shop: reduce plastic waste by not buying wrapped products or using plastic bags. Reuse as much as you can and separate your rubbish to support recycling efforts! When you are about to buy something, think of the 5 Rs! Rethink (Refuse), Reduce, Reuse, Repurpose (Upcycle) and Recycle!
-  You could grow your own vegetables in the garden: the more organic, more locally and seasonally grown, the better your vegetables are. Transporting food in container ships and trucks uses fossil fuels and emits CO<sub>2</sub>. If you eat food from your garden (or the local region), you transport it to your kitchen table yourself (or from nearby) and Planet Earth loves that.

You may remember that I gave my story the title **'My life, your life'**, and I think now you understand why. My life and your life are very much interconnected. If I am feeling good, you also have a chance to feel good. If my current environment is destroyed, your life will change for the worse as well.

There are so many ways to make me—your planet Earth—a better place!

Thank you so much for contributing!!





## **What a wonderful world**

I see trees of green  
Red roses too  
I see them bloom  
For me and you  
And I think to myself  
What a wonderful world

I see skies of blue  
And clouds of white  
The bright blessed day  
The dark sacred night  
And I think to myself  
What a wonderful world

The colours of the rainbow  
So pretty in the sky  
Are also on the faces  
Of people going by  
I see friends shaking hands  
Saying, 'How do you do?'  
They're really saying  
'I love you'

I hear babies cry  
I watch them grow  
They'll learn much more  
Than I'll never know  
And I think to myself  
What a wonderful world

Yes, I think to myself  
What a wonderful world

Oh yeah

*Lyrics: George Weiss / Robert Thiele*