

Touching the Global Warming

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Abstract

Sculpting global temperature measurements allows to make global warming perceptible and tangible. We therefore propose to project in a cylindrical coordinate system the global average monthly temperatures from 1901 to 2020, and to produce sculptures to facilitate the direct appreciation of the orders of magnitude and their evolution in time.

Sculpting data to make it tangible

The sculptures offer a natural and immediate perception by their shape, size, or reaction to light. The estimation of their mass and its distribution is also intuitive. The feeling of balance or proportion allows us to appreciate it without thinking. The observation of the roughness or the shine lets us imagine its material, its resistance and its solidity.

The sculptures can be appreciated from many angles as one moves around them. Everyone can observe how the light reacts with the surfaces to refine the representation they make of them. The viewer can interact with it through movement. In a third time, he can touch it, notice its heat, its granularity, its solidity and check its weight.

A sculpture provides information in perceptual form, and sets the stage for a conceptual understanding in which trends and orders of magnitude are correctly perceived.

Touching global warming

The 6th IPCC Assessment Report confirms it, an average global warming of more than 1°C is observed compared to 1901. In order to make this evolution perceptible, a physical representation determined in a cylindrical coordinate system (ρ , φ , z) is proposed. The years are on the z axis, the months on φ (the months are separated by 30°) and the

temperatures are on ρ . The values of ρ are determined with respect to the year 1901, which is used as a reference year. Several versions were produced by 3D printing (Fig 1).



Fig 1. *Ascendance(s) 2018*, 2018, Jean-Pascal Martin, PLA sculptures obtained by 3D printing and painted, Copyright France n°5C3Z1M8.

Global average monthly data from 1901 to 2020 were used to produce *Ascendance 2021* (Fig 2), a 62.5 cm high sculpture made of fiberglass and concrete.



Fig 2. *Ascendance 2021*, 2021, Jean-Pascal Martin, fiberglass and concrete sculpture, Copyright France n°5C3Z1M8.

To ensure the overall fluidity of the form, intermediate values are calculated by B-spline interpolation algorithm. During construction, a manual smoothing is carried out by laying cohesive strips that cover the different layers. Fiberglass and resin consolidate the work. A concrete base ensures the stability of the whole while underlining the human origin of the represented phenomenon.

Other versions are being designed, based on regional data (France, Austria, Hong Kong, Svalbard). Other materials (PLA, solid wood, aluminum) and other sizes will be proposed.

References

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Author(s) Biography(ies)

Jean-Pascal Martin is an artist working with open data. He proposes sculptures and digital works questioning the spectators on the

evolution of the world. He sculpts global warming, destruction of biodiversity, ecological footprint of countries and paints the pollution of our cities.

As a passionate coder, he devotes his personal time on applying generative design algorithm to Data Art, mainly with environmental data set. He uses data set to design paintings, sculptures or to produce music.

Jean-Pascal Martin has a PhD in Cognitive Sciences applied to semiotic description of audiovisual content. He defined the tetrahedral sign which is a cognitive representation necessarily composed of a signified and a signifier and possibly of intensional and extensional referents.

As a professional, Jean-Pascal is committed to improving communication efficiency and user experience, and is passionate about lowering the carbon impact of digital services.