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Sala Pedro Nunes, Departamento de Matemática
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Some Mathematical Aspects of The Planet Earth

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The Planet Earth System is composed of several sub-systems including the atmosphere, the liquid oceans and the icecaps, the internal structure and the biosphere. In all of them Mathematics, enhanced by the supercomputers, has currently a key role through their mathematical modeling, analysis, simulation and control. Much before the advent of computers, the representation of the Earth, navigation and cartography have contributed in a decisive form to the mathematical sciences. New global challenges contribute to stimulate several mathematical research topics. After a brief historical introduction to some of the essential mathematics for understanding the Planet Earth, stressing the importance of Mathematical Geography and its role in the Scientific Revolution(s), the modeling efforts of Winds, Heating, Earthquakes, Climate and their influence on basic aspects of the theory of Partial Differential Equations will be presented. The wide scope of these (Geo)physical problems will be illustrated with some examples from History and from current research in Free Boundary Problems arising in the Planet Earth, as well as with examples of the potential impact of the international initiative MPE2013 in Raising Public Awareness of Mathematics.