

EGU2020-21892

<https://doi.org/10.5194/egusphere-egu2020-21892>

EGU General Assembly 2020

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Chronometric measurements in geodesy and geophysics

Pacôme Delva¹ and Guillaume Lion²

¹Sorbonne University, SYRTE, France (pacome.delva@obspm.fr)

²Institut de Physique du Globe de Paris, France (guillaume.lion@ipgp.fr)

At the beginning of the 20th century the theories of special and general relativity were developed by Einstein and his contemporaries. These physical theories revolutionize our conceptions of time and of the measurement of time. The atomic clocks, which appeared in the 1950s, are so accurate and stable that it is now essential to take into account many relativistic effects. The development and worldwide comparisons of such atomic clocks allowed for some of the most stringent of fundamental physics, as well as new ideas for the search of dark matter. On a more applied level, when taking general relativity for granted, distant comparisons of atomic clocks can be used for navigation and positioning, as well as the determination of the geopotential. I will show how the chronometric observables can fit and be used within the context of classical geodesy and geophysics, presenting various applications: determination of the geopotential with high spatial resolution, vertical reference system, and discussing the possible applications associated to the geodynamic processes related to mass transfers.