

Brain activity changes on healthy adults during variable-g maneuvers

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In the last years increased attention directed towards the effect of the hyper/hypogravity on human body was reported, due to the great interest in raising the spatial mission. To understand the effect of short weightlessness periods on psychophysiological changes in human brain activity of normal healthy subjects, and how these changes may affect psychologically the person, present work reports the results obtained during a parabolic flight campaign effected using a small aerobatic plane. This aspect could help in the human survival within unsuitable environments. To perform the experiments, a small CAP10B single-engine aerobatic plane has been proposed and six healthy volunteers had accepted the challenge. The parabolic flight is characterized by gravity variations from 1g to approximately 3g, so called hypergravity phase, or reduced gravity down to 0.5g, so called hypogravity phase. During the flight the plain performed 12 parabolas in total, describing two types of experiments: within the first six parabolas the individuals had their eyes open and in the last six, the eyes closed. Electrocardigram, electroencephalogram, and oxygen content in the blood have been continuously recorded during the entire flight for all volunteers. In earlier work [Dubert et al. 2015] we discovered that changes of brain cortical activity involving the visual cortex and the limbic system are detected when the person sight is minimized. Concerning EEG data, the global intracortical activity, by lobes, was as well, for the first time presented as a temporal evolution along the parabola. Same temporal evolution comparison of physiological and phychological changes in human brain under hypo/hypergravity conditions, respectively and for different healthy subjects is proposed within present report, as general objective. Expected results could differentiate some kind of patterns of human adaptability/inadaptability to extreme gravity conditions.