

Exobiology in Southern Brazil Aiming the Monitoring of the Biologically-Effective Solar Radiation

Pabulo H. Rampelotto

Nelson J. Schuch

Marcelo B. Rosa

Ana P.S. Lima

*Exobiology and Biosphere Laboratory
Southern Regional Space Research Center
National Institute for Space Research
Santa Maria, RS
BRAZIL
pabulo@lacesm.ufsm.br*

Damaris K. Pinheiro

*Space Science Laboratory of Santa Maria
Federal University of Santa Maria
Santa Maria, RS
BRAZIL*

André P. Schuch

*Department of Microbiology
Institute of Biomedical Sciences
University of São Paulo
São Paulo, Brazil
BRAZIL*

Nobuo Munakata

*Faculty of Science, Rikkyo University, Tokyo
JANPAN*

The global reduction of the ozone layer brings the increase in the intensity of the Solar Ultraviolet Radiation reaching the Biosphere, therefore exposing the living organisms to a radiation more intense than they are used to in a period of short time, so that the natural selection may produce organisms more resistant. In this context, the Partnership between the Exobiology and Biosphere Laboratory (CRSPE/INPE-MCT), from Brazil with the Faculty of Science, Rikkyo University, from Japan, has been monitoring the biologically-effective solar radiation using spore dosimeter installed at South Space Observatory (29.4°S, 53.8°W) since 2000. The biological dosimeter is based on the spore inactivation dose of *Bacillus subtilis* strain TKJ6312, which is hypersensitive to solar radiation due to the sensitivity photochemistry of its DNA. Spore monthly exposition of biological dosimeter, in the form of Spore Inactivation Dose (SID), were compared with solar irradiance data obtained by Brewer Spectrophotometer. Through this comparison, it's intended to evaluate the biological efficiency of spore dosimetry. The significant result, with increasing indices of correlation shows the applicability of the biosensor to the

monitoring of the biologically-effective solar radiation. As spores are extremely resistant organisms to climatic conditions, for future works, the biosensor could be used for the study of the solar radiation on space or extreme environments.