Longitudinal voice analysis of spaceflight crew on a simulated mission to Mars

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Mars500 was an experiment into the psychological effects of isolation and confinement on 6 men undertaking an 18-month simulated spaceflight to Mars. It was run by the Russian Institute of Biomedical Problems (ИМБП) in 2010–2011. In the experiment many separate studies investigated the effects of isolation on the physiological and psychological health of the crew. Those studies that were based on questionnaires or on observations of social behaviour did not on the whole show much change over the mission, although significant changes in mood were reported by the participants after the end of the mission and were also found to some degree in physiological measurements. In our study we are investigating whether these reported changes in mood are apparent in the changing voice characteristics of the crew recorded in a large number of video emails sent to mission control. To explore small changes in voice over a long period we have needed to develop new techniques for modelling Fx distributions within a recording and for modelling changes in Fx statistics over time. Results are promising for the use of longitudinal voice analysis for the monitoring of physiological and psychological well-being.