EURECA'S HYPERVELOCITY IMPACT SCORE: MICROCRATER FLUX DECREASES BUT THE LARGE CRATER FLUX INCREASES IN SPECIFIC DIRECTIONS. J.A.M. McDonnell, Unit for Space Sciences, University of Kent at Canterbury, Canterbury, Kent CT2 7NR, U.K.

Eureca's 11 month space exposure in 1993-94 at a mean altitude of 508 km and orbital inclination 28.50° is very similar to both LDEF and Solar Max. From the TiCCE Capture Cell experiment aboard Eureca and other host surfaces, foil perforation distribution and crater diameter distributions have been analysed. We use for comparison the 6 point average of LDEF's records for aluminium surfaces, represents a tumbling spacecraft. Both SMM and Eureca are sun pointing and hence present over a long period a randomised exposure ('tumbling') to the orbital velocity vector.

Thus LDEF's 6 point average should therefore present a valid comparison to SMM and Eureca regarding Earth orbital components. For solar directional fluxes, however, the TICCE Eureca experiment should be more sensitive to the micron dimensioned β particles than this LDEF average.

Comparison between SMM and LDEF (exposure epochs 1980 -1984 and 1984-1990) show remarkable similarity even though on a short 10 day exposure in the middle of SMM's exposure (1982). Another perforation experiment on Space Shuttle flight 3 showed a flux a factor significantly below the average.

Eureca's exposure is, by contrast, very different from both LDEF and SMM, showing for microcraters a 10% **decrease** in the foil perforation flux. This should be compared to a 2% NASA guideline for microdebris growth rate and an assumed constant flux for natural particles.

For the "larger millicraters" (800 to 2000 μm), Eureca's flux is enhanced above LDEF by a factor of 8! If this were to be attributed to Space Debris, this flux would indeed appear to be in a runaway growth phase. But natural particulates are argued to be dominant in this increase for other reasons, namely:-

1. In size regimes where meteoroids are dominant, flux variations due to the exposure epoch and duration are evident.
2. The susceptibility of spacecraft to cometary and meteoroid sources is dependent on seasonal effects and satellite pointing direction over relatively short periods.
3. the increase of flux seen on the TICCE experiment and other faces is not apparent in the preliminary analyses of other faces. Despite the apparent randomisation of Eureca's pointing direction, the flux on different faces is not isotropic.
4. The growth of flux - and in many cases a decrease of flux - is inconsistent with the growth rate of space traffic or the accumulated manmade space population.