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ENVIRONMENTAL VERIFICATION EXPERIMENT
FOR THE
EXPLORER PLATFORM
(EVEEP)

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ENVIRONMENTAL VERIFICATION EXPERIMENT FOR THE EXPLORER PLATFORM (EVEEP) ORGANIZATION

- **PRINCIPAL INVESTIGATORS -**

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- **MECHANICAL DESIGN AND ANALYSIS - SWALES AND ASSOCIATES**
- **MECHANICAL FABRICATION - EER SYSTEMS, INC**
- **ELECTRICAL DESIGN AND FABRICATION - ITE**
- **SOFTWARE - STX**



ENVIRONMENTAL VERIFICATION EXPERIMENT FOR THE EXPLORER PLATFORM (EVEEP) BACKGROUND

- SATELLITES AND LONG-LIFE SPACECRAFT REQUIRE EFFECTIVE CONTAMINATION CONTROL MEASURES TO:
 - ENSURE DATA ACCURACY
 - MAINTAIN OVERALL SYSTEM PERFORMANCE MARGINS

- CONTAMINATION CAN OCCUR FROM EITHER MOLECULAR OR PARTICULATE MATTER
 - SOURCES OF MOLECULAR SPECIES:
 - * MASS LOSS FROM NONMETALLIC MATERIALS
 - * VENTING OF CONFINED SPACECRAFT OR EXPERIMENT VOLUMES
 - * EXHAUST EFFLUENTS FROM ATTITUDE CONTROL SYSTEMS
 - * INTEGRATION AND TEST ACTIVITIES
 - * IMPROPER CLEANING OF SURFACES

 - SOURCES OF PARTICULATES:
 - * LEAKS OR PURGES WHICH CONDENSE UPON VACUUM EXPOSURE
 - * ABRASION OF MOVABLE SURFACES
 - * MICROMETERIOD IMPACTS



ENVIRONMENTAL VERIFICATION EXPERIMENT FOR THE EXPLORER PLATFORM (EVEEP) BACKGROUND (CONTINUED)

- SPACECRAFT CONTAMINATION CONTROL
 - MATERIALS SELECTION
 - CONTAMINATION MODELING OF EXISTING DESIGN
 - THERMAL VACUUM TEST OF SPACECRAFT WITH CONTAMINATION MONITORS



ENVIRONMENTAL VERIFICATION EXPERIMENT FOR THE EXPLORER PLATFORM (EVEEP)

- Launched 7 June 1992 aboard a Delta Rocket
- EVEEP uses Temperature Controlled Quartz Crystal Microbalances (TQCM's) to measure the in-flight molecular contamination present in several locations on the Explorer Platform/Extreme Ultraviolet Explorer (EUVE) spacecraft
- Flight contamination data will be used to validate or update existing contamination modeling programs
- Contamination data was also used to evaluate whether the spacecraft outgassing rates were low enough to open the EUVE telescope doors
- EVEEP includes two Teflon-coated TQCM's which will be used to improve our understanding of the synergistic effects of Ultraviolet radiation and Atomic Oxygen on Teflon.
- Three year mission. During the first six months EVEEP does not have any significant sun time on any component.



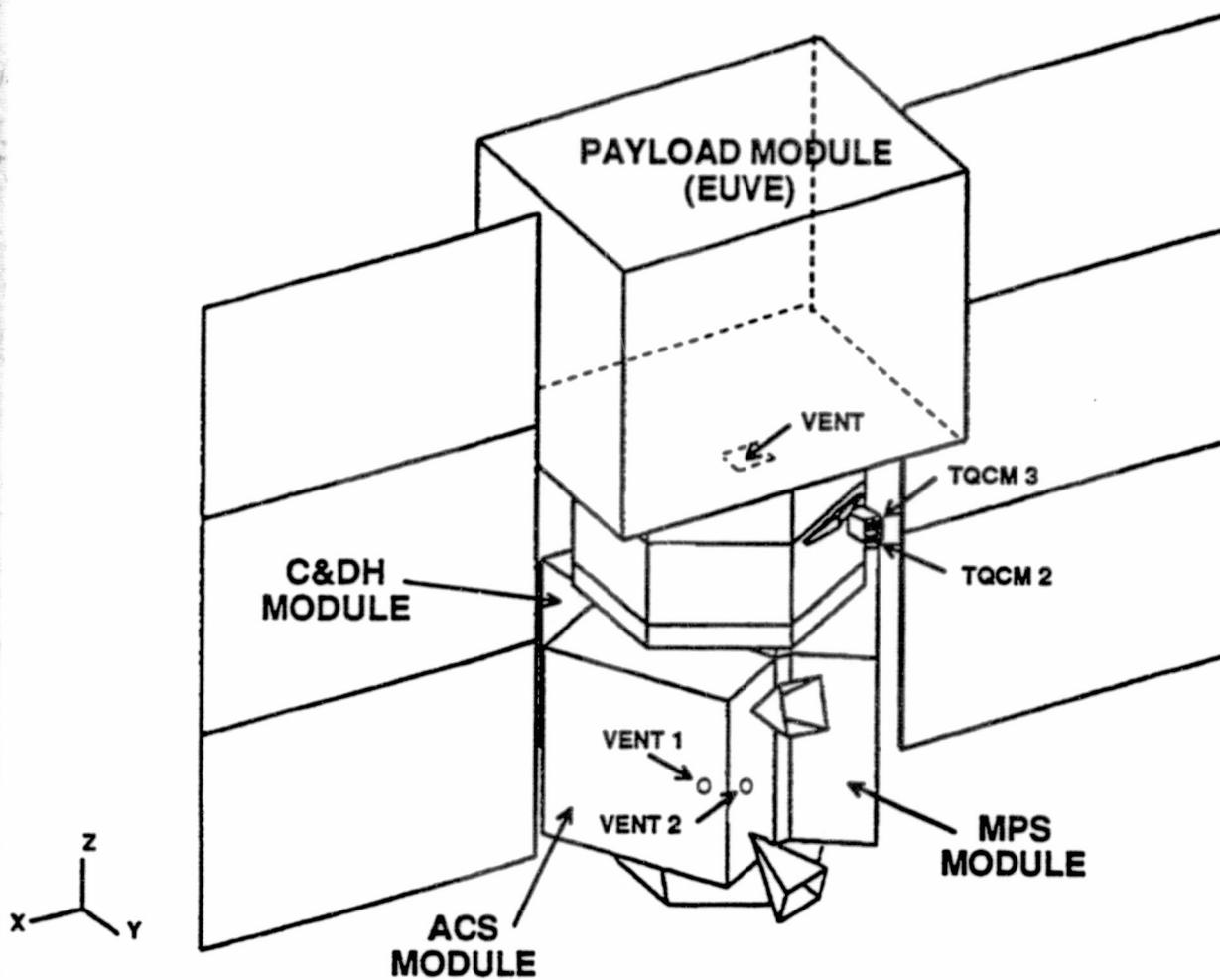
ENVIRONMENTAL VERIFICATION EXPERIMENT FOR THE EXPLORER PLATFORM (EVEEP)

EVEEP CONSISTS OF...

- A housing containing three TQCM's mounted on the shade side of the spacecraft
 - Two TQCM's face in the same direction as the EUVE telescopes; one of these TQCM's is Teflon coated
 - The third TQCM faces down toward the Explorer Platform
- A housing containing two TQCM's mounted on the sun side of the spacecraft
 - Both TQCM's face outward; one is Teflon coated
- An electronics box mounted inside the Explorer Platform
 - The electronics box provides frequency and temperature data to the spacecraft for downlinking
 - The electronics box also allows for ground control of the TQCM temperature setpoints



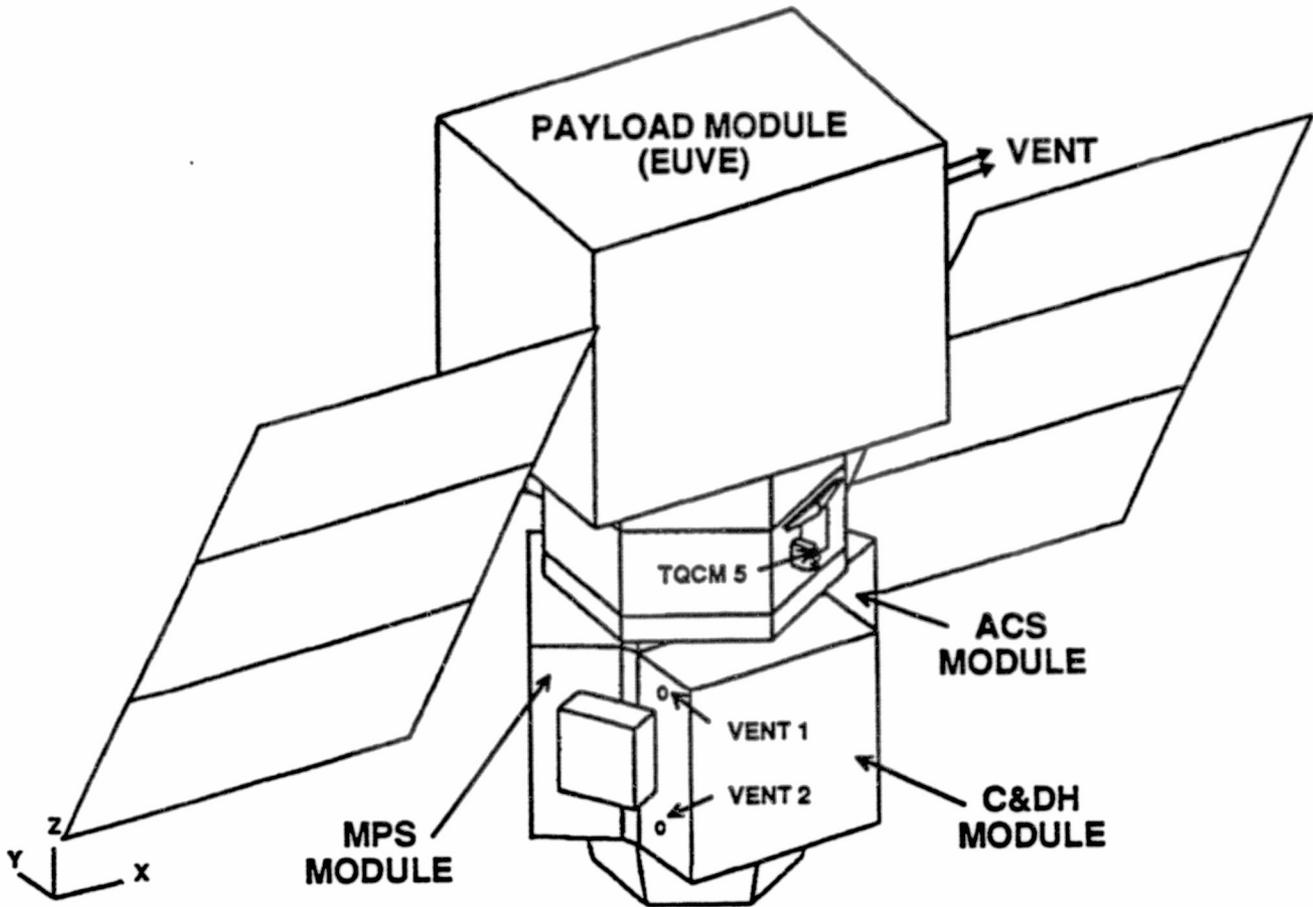
EXPLORER PLATFORM WITH EUVE INSTALLED



LOCATIONS OF EUEP TQCM'S AND SPACECRAFT VENTS



EXPLORER PLATFORM WITH EUVE INSTALLED

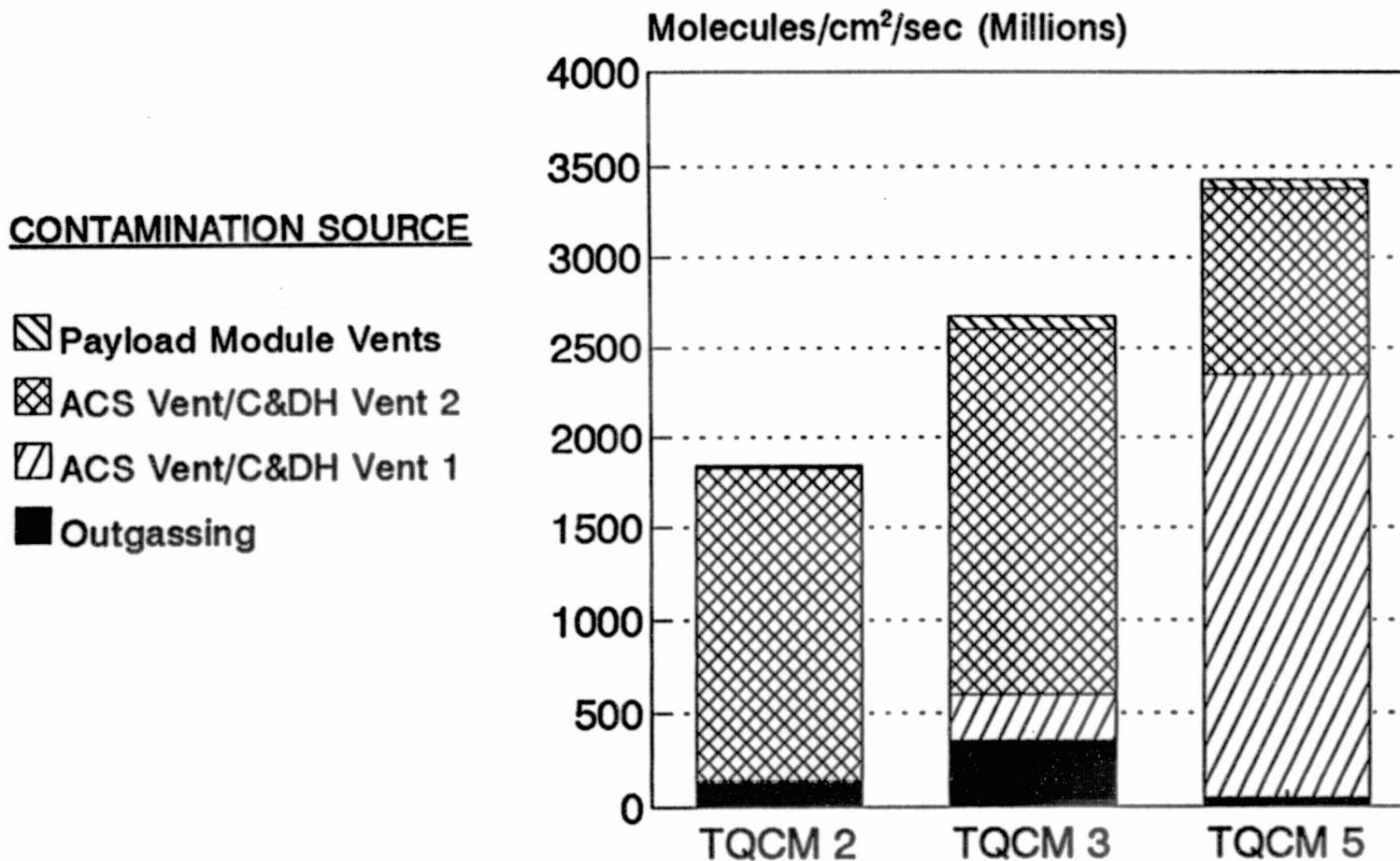


LOCATIONS OF EUEP TQCM'S AND SPACECRAFT VENTS



EVEEP PREDICTED OUTGASSING RATES

Normalized Flux of Organic Species

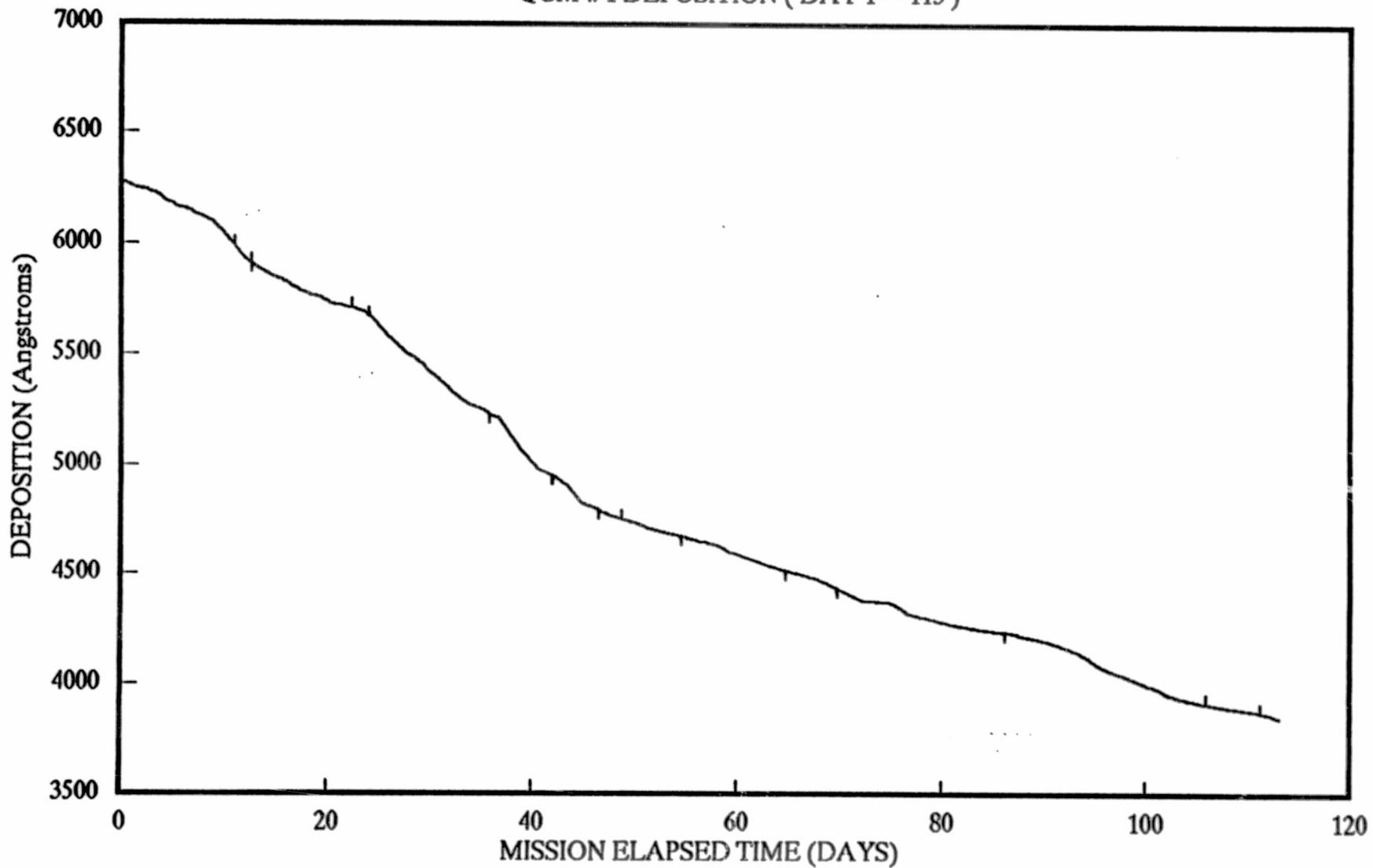


TQCM = Temperature Controlled Quartz Crystal Microbalance



EVEEP DATA CHARTS

QCM #1 DEPOSITION (DAY 1 - 113)



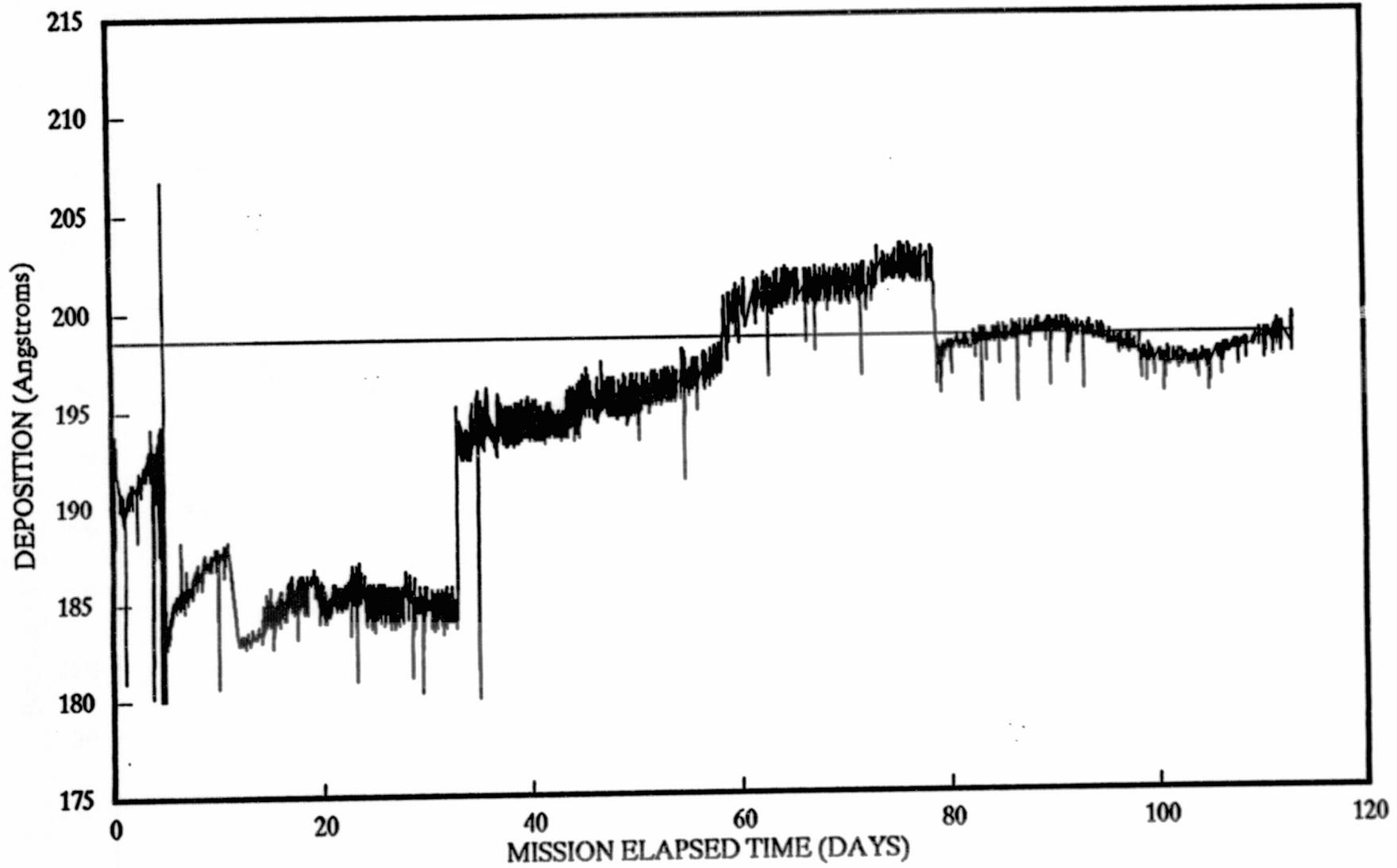
— QCM DEPOSITION

Teflon coated QCM



EVEEP DATA CHARTS

QCM #2 DEPOSITION (DAY 1 - 113)



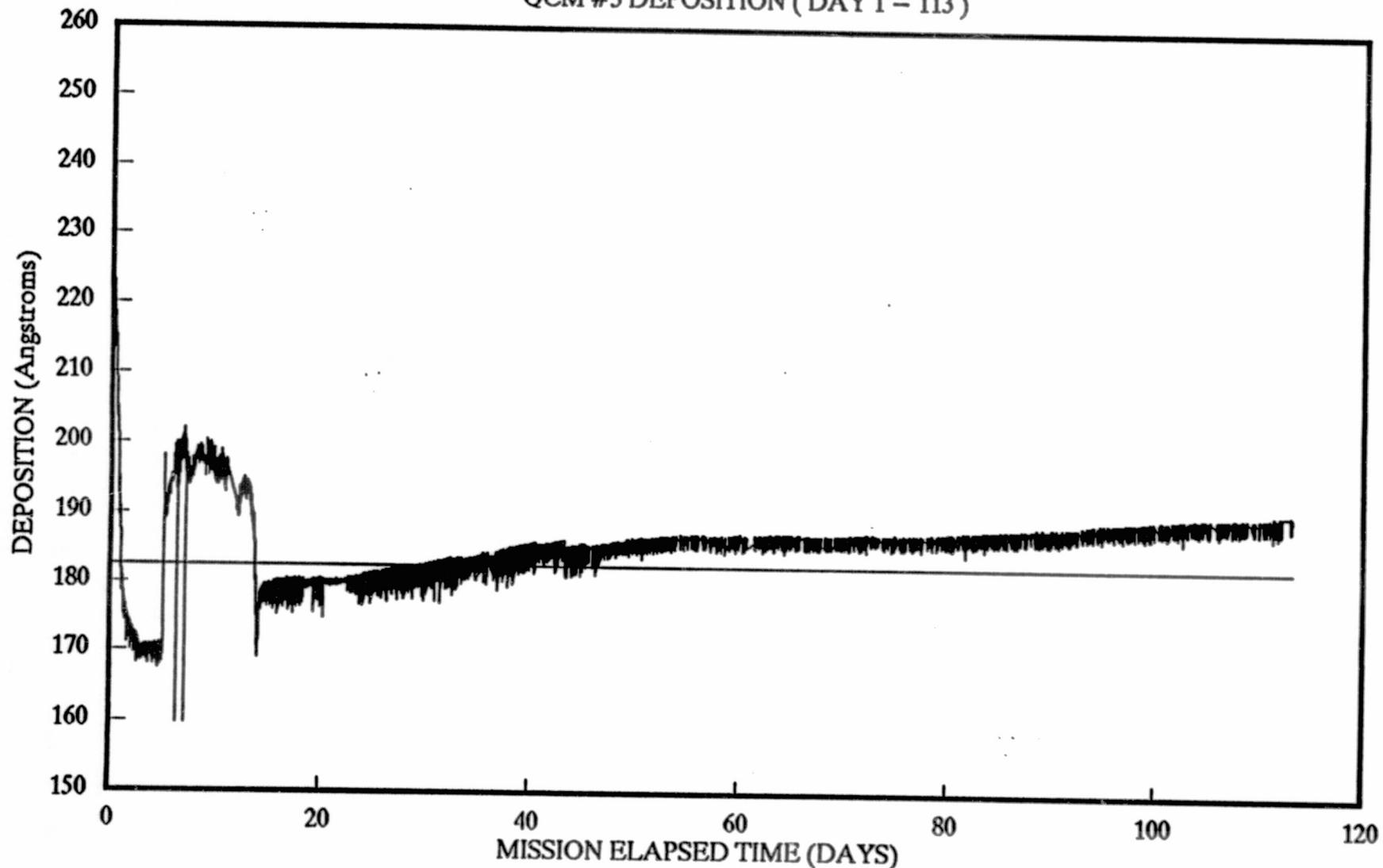
— QCM DEPOSITION

Non-Teflon coated QCM



EVEEP DATA CHARTS

QCM #3 DEPOSITION (DAY 1 - 113)



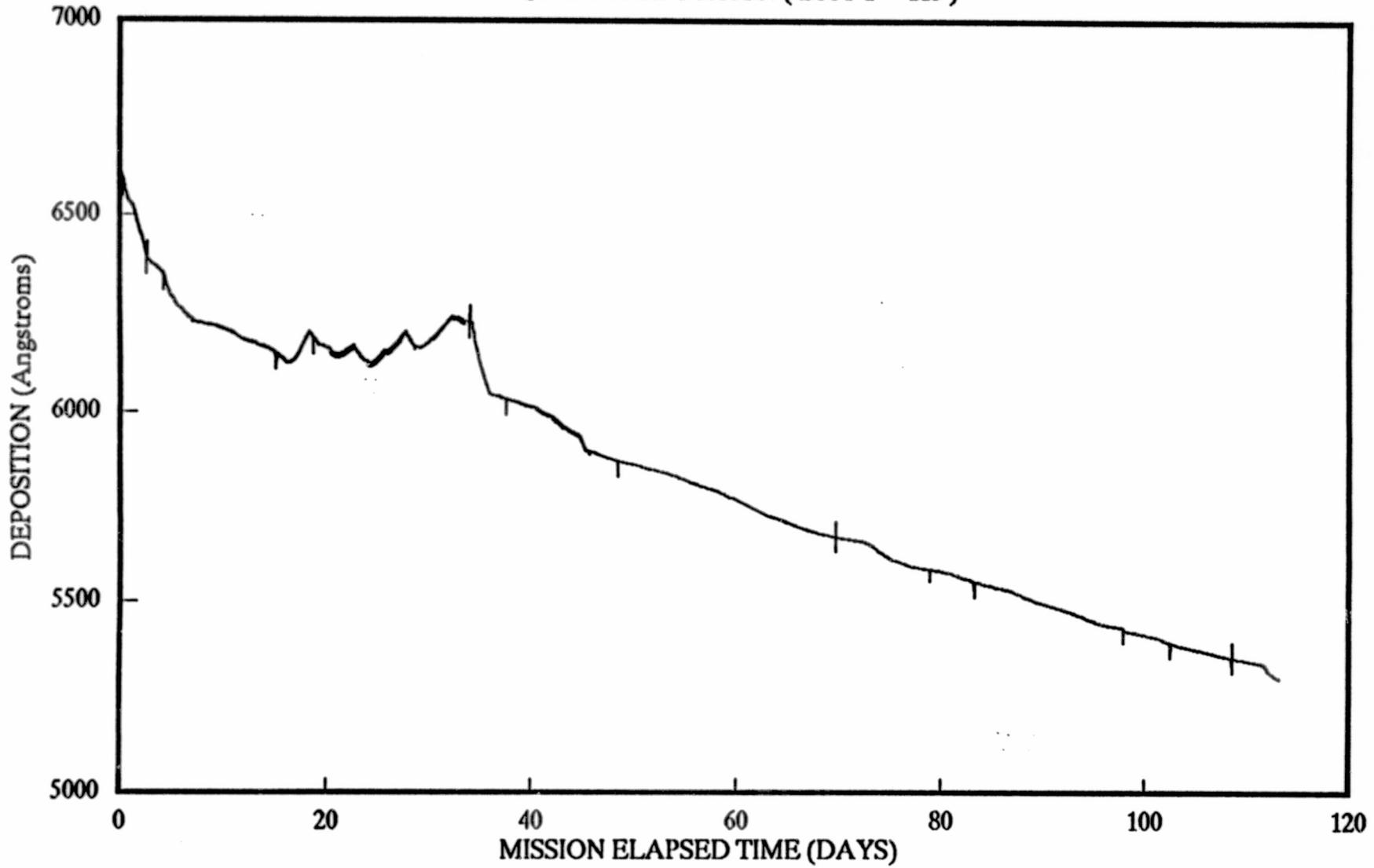
— QCM DEPOSITION

Non-Teflon coated QCM



EVEEP DATA CHARTS

QCM #4 DEPOSITION (DAY 1 - 113)



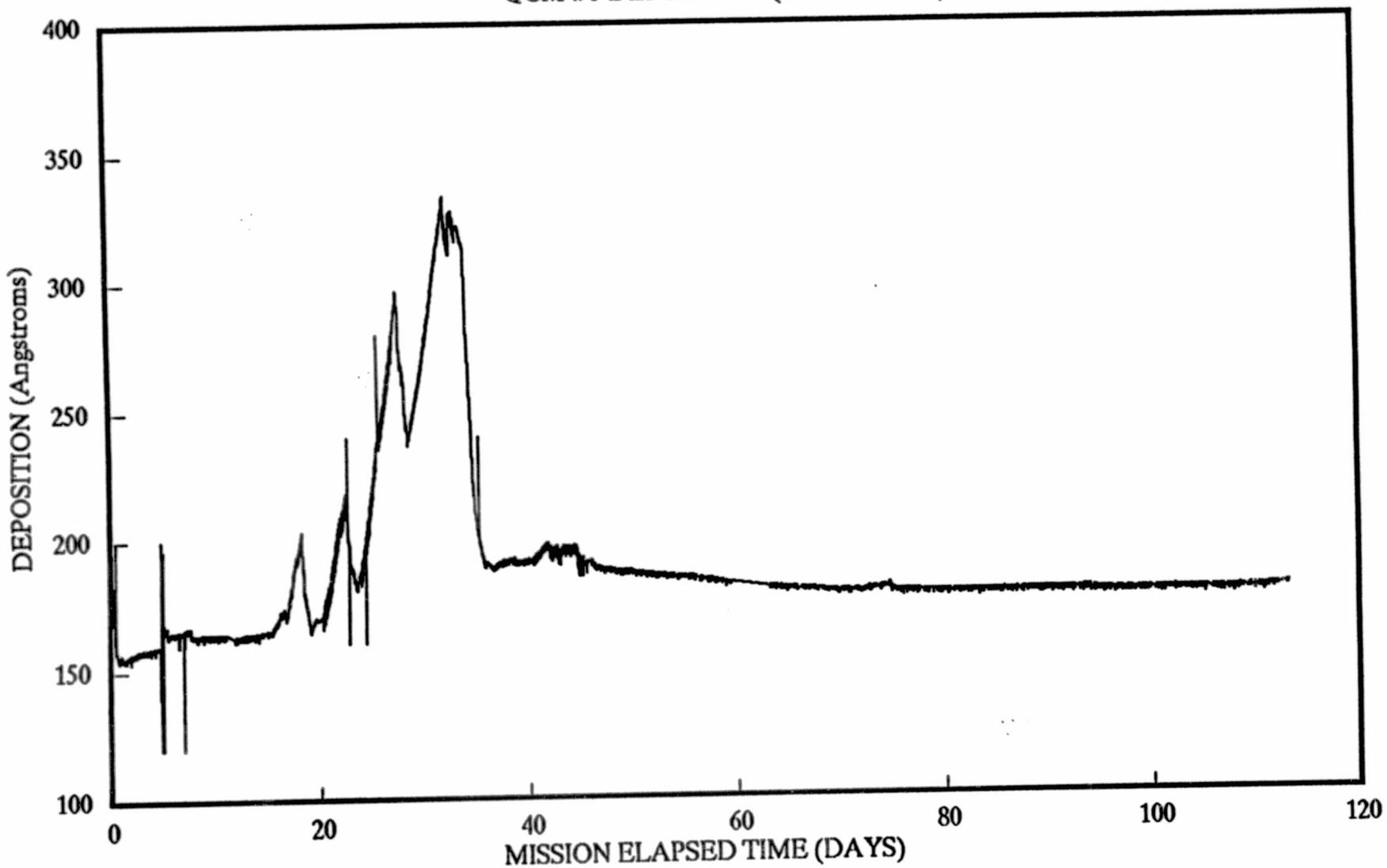
— QCM DEPOSITION

Teflon coated QCM



EVEEP DATA CHARTS

QCM #5 DEPOSITION (DAY 1 - 113)



— QCM DEPOSITION

Non-Teflon coated QCM

