

WINDOWS ON SUBDUCTION ZONE PROCESSES

Dr. Patricia Fryer, University of Hawaii

Geologic processes in subduction zones at convergent margins control geochemical cycling, seismicity, and deep biosphere activity. In shallow to intermediate zone depths, dehydration reactions release fluids from pores and from bound volatiles in oceanic sediments and basalts of the down-going plate. Metamorphism in this plate and in the overlying forearc occurs as the released fluids interact with solids. These processes take place at such great depths that they are ordinarily inaccessible for study. However, in the non-accretionary Mariana convergent margin, profound faulting permits the rise of both fluids and rock material, from depths of up to 30 km, to form enormous mud volcanoes. The erupted, serpentine mud is generated by hydration of the deeply-faulted forearc mantle and by high-pressure/low-temperature metamorphism of the subducting plate. Together, these processes provide us with a direct look at the goings-on the subduction zone. Dr. Fryer sailed on ODP Legs 125, as a co-chief scientist, and 195, as an igneous petrologist.