The major goal of the project is the geobiological description of active and fossil endolithic organisms of an oceanic crust deep biosphere collected from larger pore spaces and glassy crusts of pillow lavas, and solid portions of basaltic and ultramafic rocks from the Mid-Atlantic Ridge. Crucial is also the recognition of biosignatures of an oceanic deep biosphere. Biosignatures are e.g. organic remains/biomarkers, certain (organo-) mineral precipitates, geochemical, and isotopic anomalies. Results will be compared with samples from different localities (e.g. ODP Leg 200). For this purpose, thin sections from biologically fixed basaltic and ultramafic rock samples will be used for a comprehensive, multiphase experimental approach. The active endolithic deep biosphere will be investigated microscopically using histological and petrographic staining techniques, fluorescent *in situ* hybridization (FISH), further culture independent molecular biological methods (e.g. DGGE), and culturing of certain microorganisms. Lipid biomarker signatures and macromolecular investigations will provide further knowledge on the distribution of microorganisms, their biodiversity, and generally of organic matter. Isotope and geochemical proxies will be used to describe newly formed minerals within fractures and degassed basaltic, and ultramafic rock types (e.g. $\partial^{13}C$, $\partial^{18}O$, $\partial^{34}S$, $^{87/86}Sr$, major and minor elements, REE). We anticipate, that the analyses will demonstrate that the inner pore space of degassed basaltic rocks and fractures and ultramafic rocks is a well developed microbial ecosystem which presumably is found everywhere where oceanic crust forms the seafloor. Therefore, microbial-mediated mineralisation processes within oceanic crust pore spaces may have a significant impact on geochemical element budgets. It is possible to distinguish a fossil oceanic deep biosphere via biosignature analyses back to the Precambrian.