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The Karibib Region as an Emerging Gold District in the Damara Belt, Namibia: Linking Local Fluid Sinks to Regional Fluid Flow

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The area surrounding the Karibib town in central Namibia within the high-grade metamorphic terrain of the Pan-African Damara orogenic Belt is rapidly emerging as a significant gold district. Established deposits such as the Navachab gold mine (>4 Moz), the recently discovered Twin Hills deposit (>3 Moz), and numerous historically mined, small-scale prospects and recently delineated prospects in the region underline the prospectivity of the region. This has sparked a dramatic increase in the exploration efforts in the Karibib region. However, the range of mineralization styles, different lithological controls and varied structural positions, have posed challenges to exploration efforts. Consequently, there remains a lack of a comprehensive conceptual model that accounts for the different styles of mineralization and that may guide exploration. This presentation provides an overview of both recently discovered and existing gold deposits and prospects in the Karibib region. The study aims to identify similarities or variations among individual deposits and prospects that highlight the underlying structural and lithological controls of the regional fluid flow and gold mineralization. Gold deposits and prospects are hosted by the amphibolite-facies, mixed carbonate-siliciclastic metasedimentary sequence of the middle and upper Swakop Group. Gold-sulfide (pyrrhotite > arsenopyrite > pyrite > chalcopyrite) mineralization is associated with quartz vein systems and in parts disseminated. The vein systems vary systematically between prospects and deposits but, show close geometrical relationships with the main generation of east-northeasterly trending folds and thrusts that formed during the main phase of northwest-southeast directed, subhorizontal shortening ($D_{2/3}$) between ca. 530-510 Ma. Economic-grade gold mineralization corresponds to a combination of lithological and structural controls. This includes (1) contacts between rock types and formations of distinctly rheological contrasts, (2) high strain zones, where strain localization promoted fracturing and veining, and (3) regional-scale deviations of wall-rock structures from the main east-northeasterly Damara Belt trend.