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Gem-Potential of the Red River Shear Zone

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An increasing number of gem minerals from N-Vietnamese and S-Chinese localities reach the world market of gemstones, some of which are belonging to the highest quality of their species. Especially, rubies and spinel crystals of different colours, but also sapphire, olivine, zircon, topaz, tourmaline and beryl(emerald and aqu-marine) species give evidence of a rich and differentiated geological setting. Obviously, in near proximity there are minerals of metamorphic, metasomatic, magmatic and pegmatitic origin. Some details of mineraliza-tion history have to be interpreted on a still growing data base, since most of the mineral deposits are not ex-ploited by scientifically trained people and are positioned in areas of more or less restricted access. The northern part of Vietnam, especially the region of Yen Bai county with the city of Luc Yen as a centre of gemstone digging and trading, is dominated by the Chai River and the Red River(Song Hong) from Hanoi to Lao Cai at the Chinese border. The Red River Shear Zone is the south-eastern part of the prominent Ailao Shan - Red River Shear Zone which is one of the major geological discontinuities in East Asia. The main gem deposits in N-Vietnam are situated around the Day Nui Con Voi metamor¬phic zone where metamorphic events had reached the amphibolite facies with temperatures up to 780 oC and pressures reaching more than 7 kb. As a result metamorphic gneisses and marbles are accompanied by rocks of leucocratic melts and metasomatic events between the different materials are widespread. The main handicaps for fresh large scale outcrops are intense weathering and a usually thick vegetation due to the subtropical climate. The same situation holds for the Chinese deposits in Yunnan Province along the Yunnan Ailao Shan. Typical mineralizations of economic value within the gem regions are as follows: - in situ metamor-phic/metasomatic deposits - in situ magmatic/pegmatitic deposits - alluvial deposits. The alluvial deposits are at present the main source of gem materials of all kind, whereas the primary deposits are usually not suited for direct access. Nevertheless, the material delivers genetic information on the actual mineralization history. At present, the following principally different primary assemblages may be distinguished: Corundum (sapphire) in gneisses - ruby in marble - spinel in marble - pegmatitic gem-minerals(topaz, tourmaline, quartz, beryl etc.). The overall gem potential of the region is high since the geological units are large and the mineraliza-tions are rich; nevertheless, special gem enhancement routines may be successfully developed for optimizing the individual potential of different gems.