ENVIRONMENTAL IMPACTS OF MINING THE GIANT PANZHIHUA V-TI MAGNETITE DEPOSIT, SW CHINA. Ni Shijun[1,2], Zhang Chengjiang[1], Teng Yanguo[1], Ma Yuxiao[3], Mei-Fu Zhou[2], Min Sun[2], John Malpas[2], Li YuChang[3] , Wang Zhenguo[4] ([1.]Chengdu University of Technology, Chengdu, 610059, China, nsj@cdit.edu.cn, ni1957@163.com, tyg@cdit.edu.cn [2.]Department of Earth Science, University of Hong Kong, Pokfulam Road, Hong Kong, China, mfzhou@hkucc.hku.hk, minsun@hku.hk, jgmalpas@hku.hk [3.]Panzhihua Bureau of Geology and Mineral Resource , Sichuan, China [4.] Panzhihua Mining Company , Sichuan, China)

The giant Panzhihua Vanadium -Titanium magnetite [$Fe(V,Ti)_3O_4$] deposit, located in the southern part of the NS-trending Panxi rift valley, along the Jinsha River (a tributary of the Yangtze River) in Southwest China, provides 20% of the Fe , 64% of the V and 53% of the Ti supply for China. The mining camp includes 6 large-scale iron deposits hosted in basic-ultrabasic intrusions, numerous medium-size coal , clay, dolomite, limestone deposits , and minor graphite, manganese and barite deposits. Production facilities include a large steel manufacturing mill and a steel rolling mill. The extensive mining and processing activities have had major environmental impacts.

Mining activities have left huge uncovered slopes, large areas of gangue ground and extensive tailings dams. 11.50 million tons of Fe ore is mined per year, and more than 680 million tons of excavated ore and gangue, and 220 million m^3 of tailings reserve have been deposited near the Jinsha River . Thus there is severe threat of heavy metal pollution both in the mining area and further down stream towards the Yangtze River.

The mining activity is located along the eastern margin of the Tibetan plateau, a tectonically active region. Rapid geological events such as debris flows, landslips and large-scale subsidence take place repeatedly in the area. Mining activities have accelerated these geological catastrophes.

Mining and processing activities have increased the level of air pollution, with higher levels of soot, dust, smog and other deleterious gases. In the last 3 years, the total amount of pollutant gases is estimated at 84.8 billion m^3. Measured abundances of SO_2, NOx , TSP, and CO in the air are regularly more than permitted by government requirements.

Mining activities therefore threaten the ecology of the Jinsha and Yangtze Rivers. Soil erosion rates of the Neocene -Quaternary Xigeda Formation are between 5000-8000 tons/Km^2 per year. Soil loss in the Panzhihua mining area is 3.7 to 5.9 mm per year, significantly higher than in areas where there is no mining activity. Thus, mining activities distribute much of the soil and unconsolidated sands subsequently found in the water of the Yangtze River. In 1999, the SP (suspended particle) content of the water of the Jingsha River within the mining area was 224% to 289% over acceptable amounts.

Experimental land reclamation has been carried out in typical gangue ground, and an ongoing research programme investigating the tailing and soil geochemistry in the mining area will play an important role in rehabilitation of the ecological system .

Because mining activities have not only affected the immediate ecological environment of the Panzhihua region, but also mid-downstream stretches of the Yangtze River, the mitigation of the impacts of mining and the recovery of the ecological system, should be managed by a mining environmental manage system (MEMS), which ensures sustainability of resources, environment, economy and society in this area.