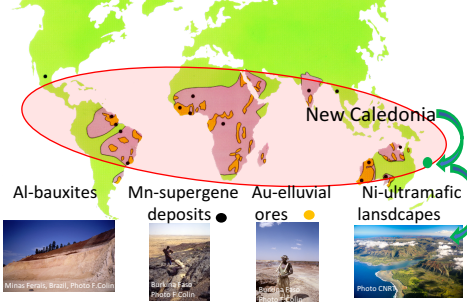
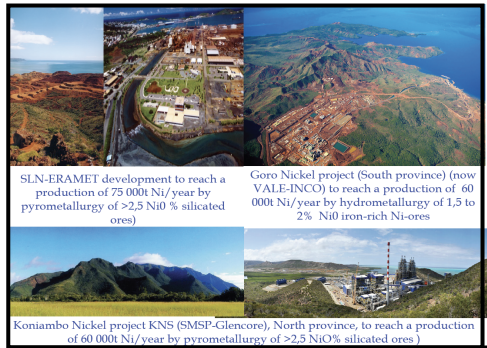


Global context: Conjugating mining production and biodiversity preservation: a world development issue



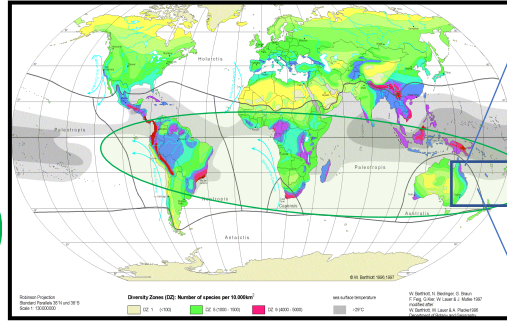
Tropical metal-rich laterites have developed for 80 Myears mostly at the expenses of primary rocks from Precambrian shields. These resources are future reserves for South countries developments.

Mining production objectives



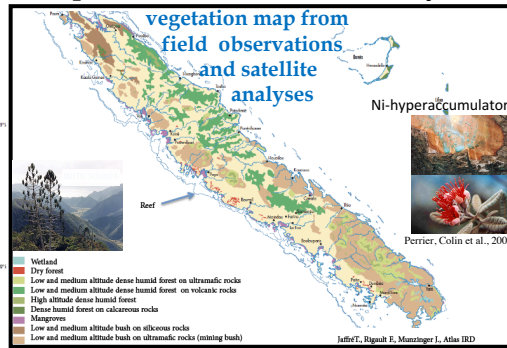
The objectives of the 3 main mining projects is to reach a production of 200 000 Nit/year in 2020.

R&D contributions



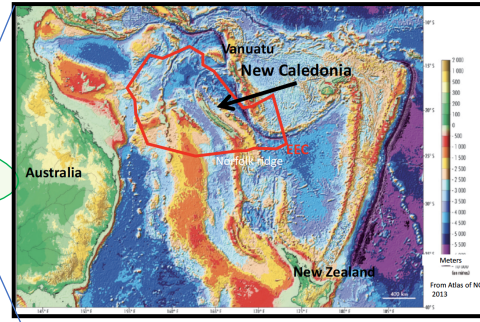
The tropical belt contains a wealth of biodiversity that is the humanity's sustainable reserve for the future. The biodiversity loss is increasing and inscribed these areas as biodiversity hot spots to be protected and preserved.

Exceptional terrestrial biodiversity



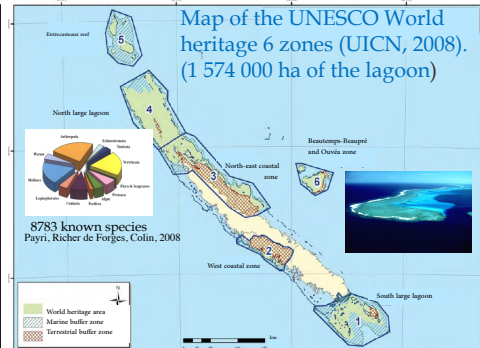
80% of the terrestrial ecosystems species are endemic and mainly develop within ultramafic mining areas.

Geography, geology, and Ni-deposits of New Caledonia



The Main NC Island set at the northern tip of the Norfolk ridge, both were rifted from the Australian margin during late Cretaceous. The ophiolitic units were obducted onto the Norfolk ridge 34 Myears ago.

Exceptional marine biodiversity

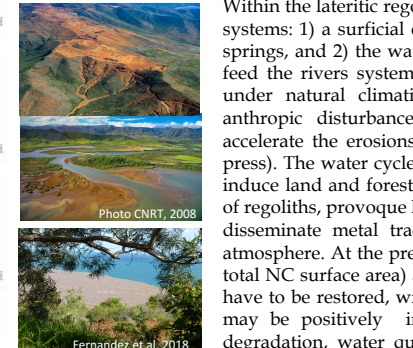


The marine and terrestrial buffer zone adjacent to the Goro-Vale mining project is included (zone 1)

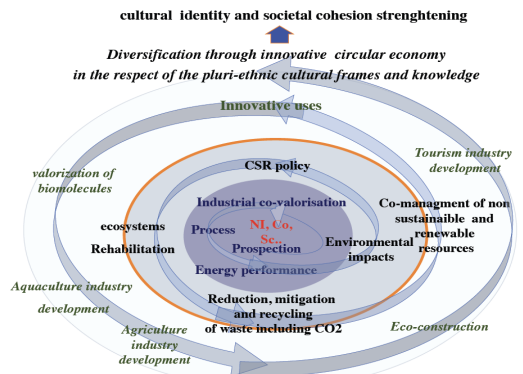


and a societal driver. In addition to SLN activities, 2 new worldwide projects (*) have been developed since 1998, as a result of the political "Accord de Nouméa" between pluriethnic groups and to balance the economic development between Provinces, using pyrometallurgy (Ni-Si-ores) and hydrometallurgy (Ni-Fe-ores) processes.

Environmental and societal on going impacts



Within the lateritic regolith, the circulation of waters is mainly controlled by two systems: 1) a surficial one, just under the iron crust, that feed locally the water springs, and 2) the water table at the weathering front of the parent rocks, that feed the rivers systems. The lateritic surficial formations are erosion-sensitive under natural climatic tropical events (lavakas, collapses, creepings), and anthropic disturbances (fires, urban development, mining activities) may accelerate the erosions rates as well (>1000 t/an/hectare) (Maurizot et al., in press). The water cycle can then be very rapidly affected. Mining activities may induce land and forest degradations and biodiversity losses, accelerate erosion of regoliths, provoke hypersedimentation in downslope rivers and lagoon, and disseminate metal trace elements through biosphere, hydrosphere and low atmosphere. At the present day 10,000 hectares of orphaned mines (0,6% of the total NC surface area) and 20000 hectares of degraded soils in active mine areas have to be restored, with a cost of 20,000 euros/ha. Populations leaving nearby may be positively impacted by employment, and negatively by land degradation, water quality decrease, rivers and lagoon contamination, that could affect directly their sustainable natural resources and their way of life in the future, while nickel ores are non renewable resource: **mining activities have to be lead responsibly.**



Since the year 1990, poorly surficial Ni-Fe ores are increasingly exploited (hydrometallurgy) and because these minerals are very extensive on the surface, its may induce very significant damages to ecosystems and disrupt the functioning of hydrosystems. In addition, from 2008 (world economic crisis) to present time, even if the GDP/inhab. remains constant, for the first time in its history, New Caledonia's real growth rate is inversely correlated to its nickel increasing production, to reach a very low rate of 2,5%. The Ni weight of nickel income in the total NC GDP reaches its lowest value of 4,5%. In addition, the production of CO₂ increase from 2008 at a annual rate of 4,5% due to the use of coal-fired power plants to produce the energy required for metallurgical power plants (8 MtCO₂eq./y emitted = 30t of CO₂ eq./inhab./y.) As a consequence, based on the knowledge intangible capital issued from research, we promote a new virtuous spiral model of mining activity, that will simultaneously permits to develop a sustainable diversified economy from natural renewable resources and to value the skills acquired (www.amedee-network.science).

