Let the Earth help us to save the Earth

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Volcanoes emit around 300 million ton of CO2 annually. If one multiplies this number by the age of the Earth (4.5 x 109 year), this results in a gigantic number. If all that CO2 had remained in the atmosphere and the oceans, the Earth would be covered by a thick layer of CO2 with a pressure in the order of 100 bars, and due to the greenhouse effect, the surface temperature of the Earth would be 500 degrees centigrade. Life would be impossible on Earth. As there is life, it means that almost all of this CO2 has been captured and safely and sustainably stored. The process is simple. Weathering of basic silicates is a reaction between rocks and CO2 and water. The following is a typical weathering reaction

Mg2SiO4 + 4 CO2 + 4 H2O 🡪 2 Mg2+ + 4 HCO3- + H4SiO4

The resulting Mg-bicarbonate solutions are carried by rivers to the sea, where corals, shellfish and plankton convert it to solid carbonates. These carbonates form limestones and dolomites. These sediments contain about a million times more CO2 than the combined seas, atmosphere and biosphere.

Presently, mankind burns in a few hundred years all the fossil fuels (oil, gas and coal) that have taken hundreds of million years to form. The resulting CO2 emission is about hundred times more than the annual production by volcanoes, so the weathering process cannot keep pace with this huge amount. The weathering process takes place at the surface of solid rocks, so a simple way to regain a new balance between input and output is to increase the available surface of solid reactive rocks also hundredfold by mining those rocks, crushing it, and spread the grain over fields and shallow seas. This requires the annual mining of 7 km3 of suitable rock. As the mineral olivine is very common and weathers fast, the mining of 7 km3 is possible, and is within the normal scale of large-scale mining. Many olivine massifs are close to the surface, and can be mined in open-pit mines. The largest existing open pit mine has an excavated volume of 25 km3. Instead of opening one gigantic olivine mine like this, one should start a few tens of new large (but not gigantic) olivine mines, strategically spread over the continents to save transport costs, and to distribute the advantages of additional employment by mining over a number of countries. Some examples of olivine applications which have additional advantages (making olivine spreading cheaper) are:

Increasing rice production, treating acid soils by olivine, adding olivine to biodigesters, treating the sick-building syndrome in schools and offices, use the surf as a zero cost huge ball-mill, cultivate diatoms for biofuel production, recover nickel from olivine soils by phytomining, construct olivine hills to produce healthy mineral water and quenching forest fires by serpentine emulsions.