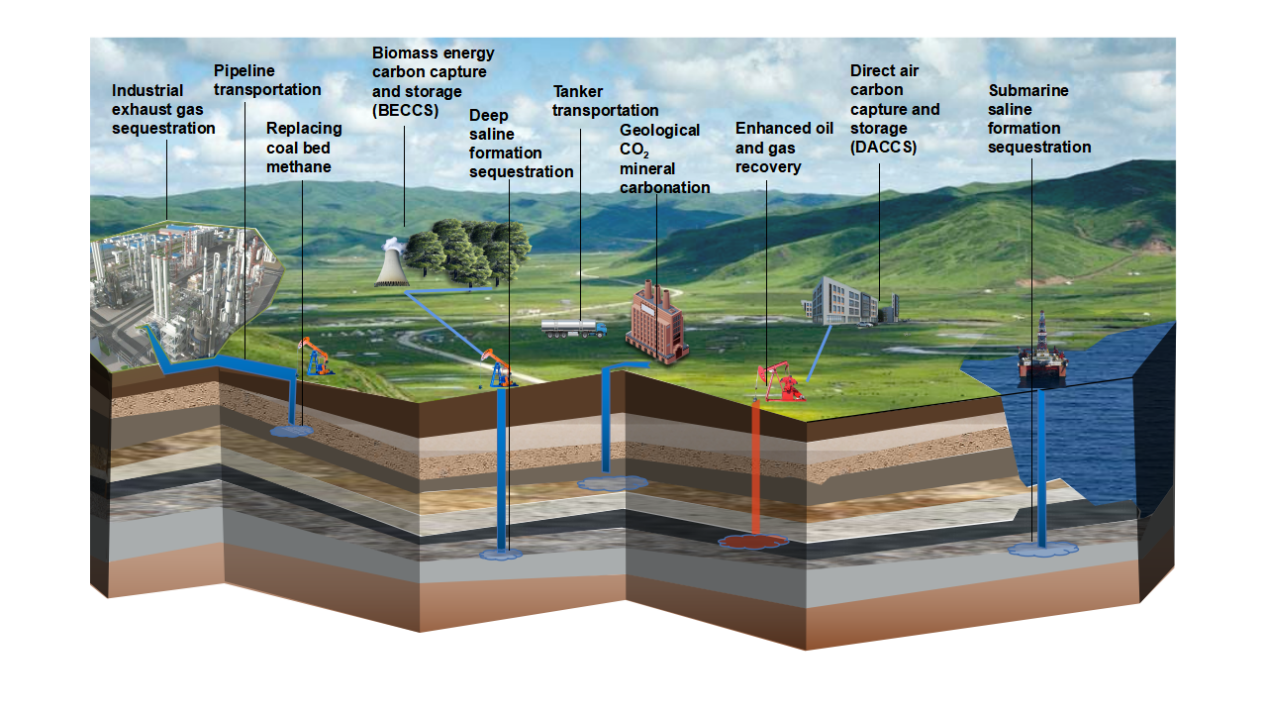
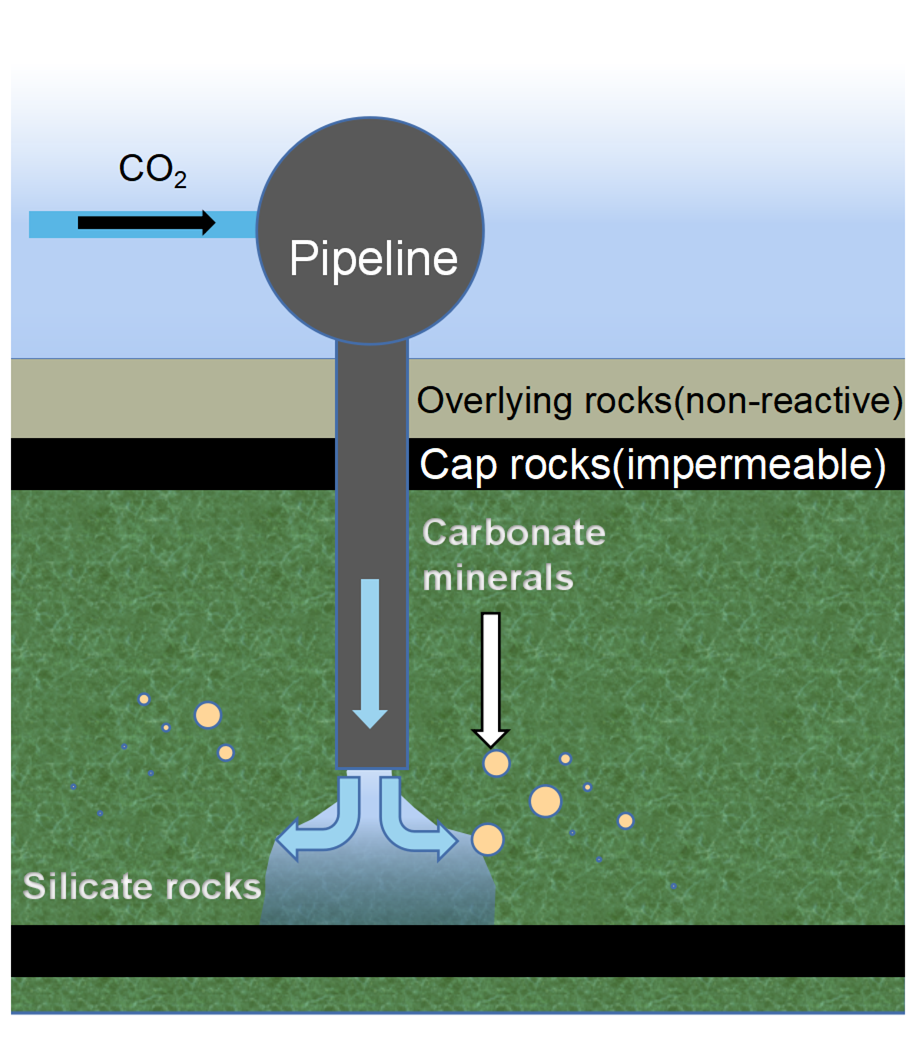
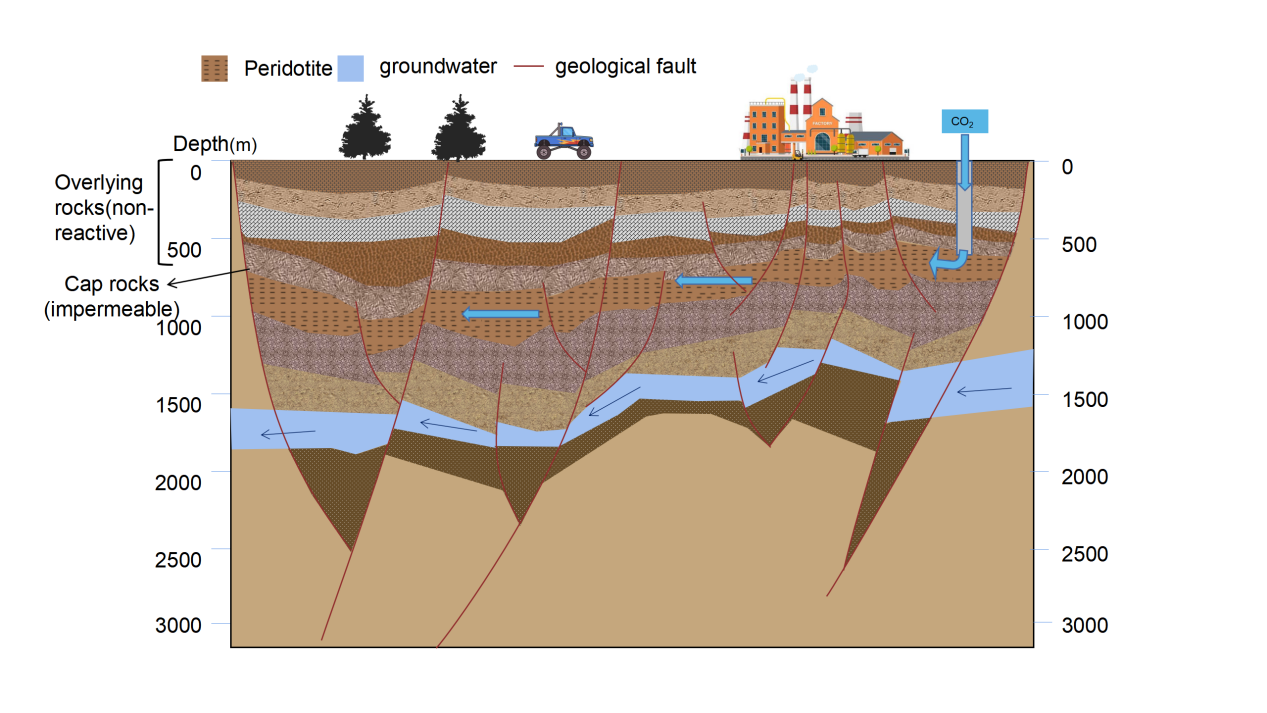
**Supplementary Information**

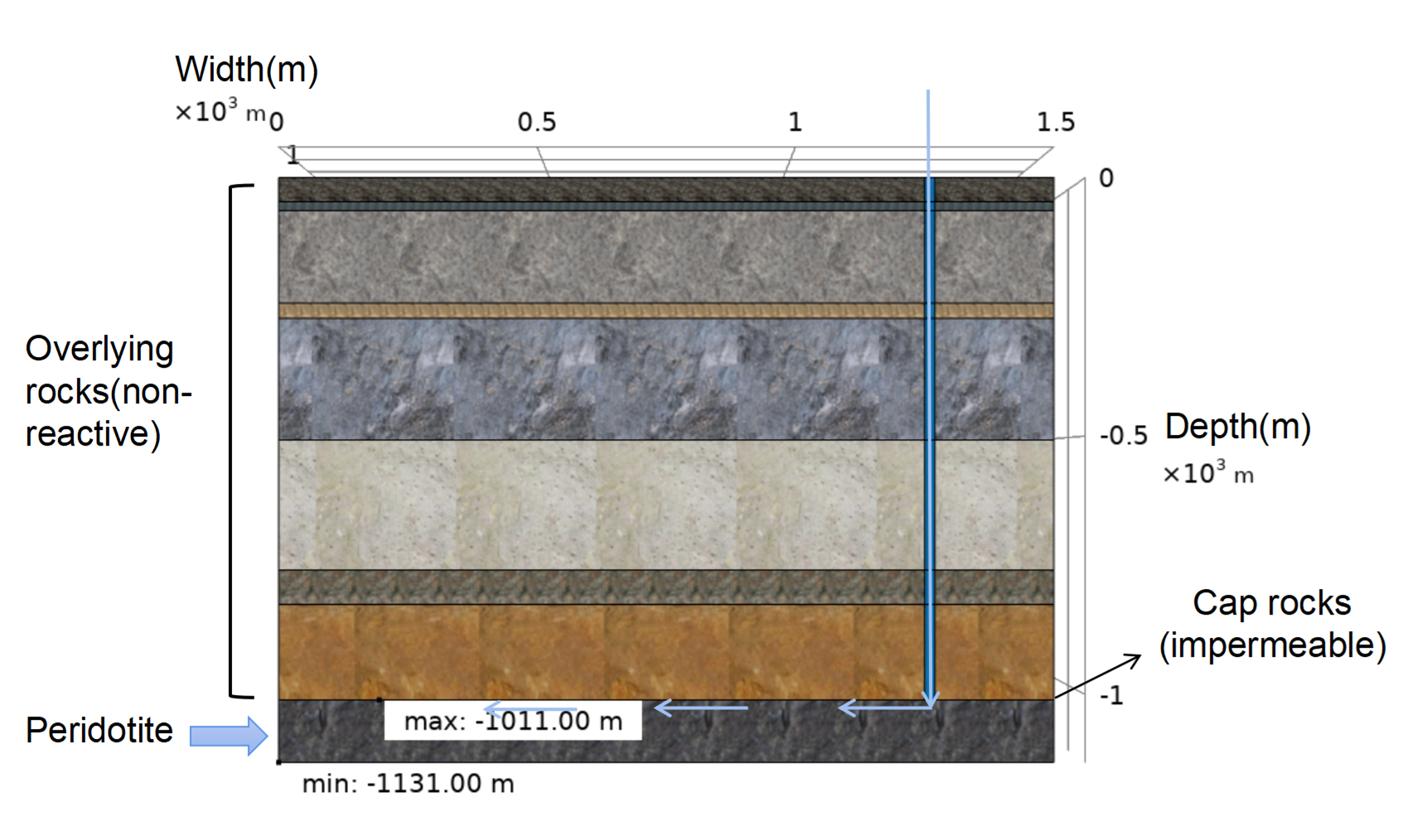


Supplementary Information Fig. S1. Schematic diagram of CO2 capture and storage (CCS) technology and main types.



Supplementary Information Fig. S2. Schematic diagram of the mineral carbonation operation.



a 

b

Supplementary Information Fig. S3. Stratigraphy Vertical section.a. Schematic diagram of the overall stratigraphic section; b. Schematic diagram of local stratigraphic section.

Supplementary Information Table. S1 .The typical parameters of peridotite used in the modelling.

|  |  |
| --- | --- |
| Parameter | Value |
| Density of peridotite | 3210kg/m³ |
| Porosity of peridotite | 1% |
| Permeability of peridotite | 1×10-13m2 |
| Thermal conductivity of peridotite | 2W/(m·oC) |
| Heat capacity of peridotite | 1036J/(kg·oC) |
| Effective grain size of peridotite | 7mm |
| Exothermic heat of the carbonation reaction | 760kJ/kg Mg2SiO4 |

Supplementary Information Table. S2.The expenses and benefits of CCS with geological mineral CO2 carbonation for current general case and future best case(calculated at 0.6 RMB/kWh electricity price, $1 = 6.6RMB).

|  |  |  |  |
| --- | --- | --- | --- |
| Case | Cost components | Items | Price (unit:$/t CO2, negative numbers indicate expenses, positive numbers indicate benefits) |
| Current general case | Expenses | Carbon capture + tanker transport 35km | -26.550 |
| No cost-sharing facility with typical case of sequestration technology | -8.838 |
| Benefits | Electricity gains,thermoelectric efficiency at 4% | +1.218 |
| Value of avoided carbon emissions,thermoelectric efficiency at 4%, at the price of China's current carbon emission allowance | +0.038 |
| Policy subsidies, at the price of China's current carbon emission allowance | +9.091 |
| Total CCS cost | Add above items | -25.041 |
| Future best case | Expenses | Carbon capture + tanker transport 35km | -26.550 |
| Surrounded by cost-sharing facilities with the improved temperature conditions for sequestration technology | -2.926 |
| Benefits | Electricity gains,thermoelectric efficiency at 10% | +3.055 |
| Value of avoided carbon emissions,thermoelectric efficiency at 10%, calculated at the subsidized price $50 / t CO2 for CO2 geological storage in the United States in 2026 (the price of carbon emission allowance that China may reach in the future) | +0.517 |
| Policy subsidies, at the price of carbon emission allowance that China may reach in the future | +50.000 |
| Total CCS cost | Add above items | +24.096 |