

IAH network on “Coastal aquifer dynamics and coastal zone management” QUESTIONNAIRE

IAH national committees, IAH members and non members from all around the world involved in SWI and SGD research and management are kindly asked to fill in the questionnaire in this page with as many details as possible.

A world database will be set up and made available, with basic coastal aquifer main characteristics.

We expect to gather standard and comparable information on the knowledge level and hopefully the state of the art of the research on SWI and SGD, and coastal aquifer management methods adopted around the world

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| 1) | Location of aquifer (country, more specific location): | Grande Comore Island, Southwestern Indian Ocean |
| 2) | Reported by: | A. Bourhane, J-C. Comte, J-L. Join and T. Mara |
| 3) | Type of medium (karst, porous, fracture) | Fractured lava flows, porous ashes levels and lava tunnels |
| 4) | Type of aquifer (phreatic or confined) | Volcanic aquifer system consisting of a phreatic aquifer and semiconfinated levels |
| 5) | Main lithology - (e.g. gravel, sand and clay) | Basalts and volcanic rocks (AA and pahoehoe flows, tuff cones) |
| 6) | Hydrochemistry: fresh or saline | Fresh and saline |
| 7) | Saltwater intrusion: lateral from sea or lakes - upconing | Lateral intrusion from the sea, possible upconing below boreholes |
| 8) | Aquifer geometry: hydraulic characteristics | Continuous basal aquifer in volcanic massif, depth of substratum unknown; T 1e-2 to 3e-1; K 1.6e-3 to 2.7e-1; S 2.2e-5 to 1e-2 |
| 9) | Aquifer parameters: storage - annual water pumping - (in MCMA - millions cubic meters, annually) | The annual rainfall varies from less than 1.5 m in the north-east up to more than 5 m in the south-west of the island. The combined annual abstraction of the currently 11 operating wells can be estimated at about 7 millions of m ³ |
| 10) | Depth of aquifer (water level and bottom) - water level 5-30 m - aquifer depth - 50-200 m | Water level few m to few hundred m deep
Aquifer depth unknown |
| 11) | Major chemistry (anions - ?; Cations - ?): | Na Cl (seawater) |
| 12) | Major salinity sources: | Some simulations support the hypothesis that local volcanic structures can strongly impact the seawater intrusion at the local and field scale. |
| 13) | Population: | Its population as of 2006 is about 316,600 |
| 14) | Aquifer status: special features - e.g. thermal springs, major faults,... | Locally perched aquifers with springs
Strong hydrodynamic and salinity control by tides |
| 15) | Investigation methods - e.g. water level measurements, EC (electrical conductivity profiles), TDEM (geophysical), | Time Domain Electro-Magnetics [TDEM] soundings and Electrical Resistivity Tomography [ERT] profiles
Groundwater time series on production boreholes |
| 16) | Numerical hydrological modeling, chemical and isotopic methods, age determination, IR survey, seepage meters (for Submarine Groundwater Discharge, SGD) | 3D numerical model |
| 17) | Monitoring methods applied and duration - water level measurements, EC (electrical conductivity profiles - seasonal) | 1 year time series of water level, EC and temperature measurements in production boreholes |
| 18) | Management methods: | Suggestion of optimising pumping schedules with tides, ie. pumping at low tide when salinity is lowest; and optimizing prospecting by favorising large diameter borehole with low depth of water table penetration in area of highest rainfall |
| 19) | Aquifer management actions: | Recommendation for freshwater development: use of large diameter wells that penetrate the water table on a few meters; adapt pumping schedule to tidal regime |
| 20) | Identification of existing or potential problems: | Groundwater is the only safe water resource for drinking, but only one third of water extracted has salinity values acceptable for drinking |
| 21) | Annexes: | |
| 22) | Observations: | |