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

1)	Location of aquifer (country, more specific location):	Mba Island, a small coral reef island located in the Noumea lagoon in the southwestern region of New Caledonia
2)	Reported by:	JC Comte, O Banton, JL Join, G Cabioch
3)	Type of medium (karst, porous, fracture)	Porous (unconsolidated coral sands)
4)	Type of aquifer (phreatic or confined)	Phreatic
5)	Main lithology - (e.g. gravel, sand and clay)	Composed of modern and Holocene carbonate sediments lying on a Pleistocene reef unit. The Holocene sediments are made of carbonate sands of fine to medium sized grains combined with rare coral debris and sometimes discontinuous relicts of beach rock. Just below the sand layers, the Pleistocene basement, found to be more than 26 m deep, is characterized by a succession of coral buildups, layers of skeletal, and algal debris, sands, and cavities. The Pleistocene reef sequence is generally more lithified than the Holocene sediments, possibly karsitfied
6)	Hydrochemistry: fresh or saline	Brackish/Fresh water
7)	Saltwater intrusion: lateral from sea or lakes - upconing	Freshwater lens of varying thickness: thicker on high and poorly vegetated dunes, thiner on low, highly vegetated dunes
8)	Aquifer geometry: hydraulic characteristics	Hydraulic conductivity is around 10m/d effective porosity is around 20% in holocene sediments
9)	Aquifer parameters: storage - annual water pumping - (in MCMA - millions cubic meters, annually)	In the sectors with the highest dunes, recharge exceeds water uptake, resulting in a freshwater replenishment rate of 300 mm/y. In the low-lying, central sectors, groundwater uptake through evapotranspiration produces a withdrawal rate of about 200 mm/y.
10)	Depth of aquifer (water level and bottom) - water level 5- 30 m - aquifer depth - 50-200 m	0 to > 25m
11)	Major chemistry (anions - ?; Cations - ?):	Na Cl
12)	Major salinity sources:	Seawater (+/- evapoconcentrated through vegetation transpiration)
13)	Population:	None
14)	Aquifer status: special features - e.g. thermal springs, major faults,...	
15)	Investigation methods - e.g. water level measurements, EC (electrical conductivity profiles), TDEM (geophysical),	Groundwater monitoring in piezometers (heads and EC) Electrical resistivity tomography (ERT) to image geometry of the freshwater lens
16)	Numerical hydrological modeling, chemical and isotopic methods, age determination, IR survey, seepage meters (for Submarine Groundwater Discharge, SGD)	The three-dimensional finite difference code SEAWAT was applied to simulate the flow and saltwater interface on Mba Island. The two-dimensional finite element numerical code SUTRA was then applied to compare at higher resolution both heads and salinity with geoelectrical data measured on the transverse profile.
17)	Monitoring methods applied and duration - water level measurements, EC (electrical conductivity profiles - seasonal)	
18)	Management methods:	
19)	Aquifer management actions:	
20)	Identification of existing or potential problems:	
21)	Annexes:	Comte, J-C, Banton, O., Join, J-L & Cabioch, G. (2010). Evaluation of effective groundwater recharge of freshwater lens in small islands by the combined modeling of geoelectrical data and water heads. Water Resources Research, vol 46, no. 6, W06601.
22)	Observations:	The geometry and salinity of the freshwater lens are controlled by the magnitude and the spatial distribution of both groundwater recharge and uptake by roots.