o-well Data set

```
head(owell.metals) # Table 1.
```

```
##    As    B  Ba  Be  Cd  Co  Cr  Cu   Fe   Hg  Mn Mo  Pb  Se  Zn
## 1 0.2 15.2 7.1 0.3 0.3 0.1 0.5 0.6 93.0  0.5 0.1 26 2.2 1.5 0.8
## 2 0.3  9.4 7.5 0.3 0.4 0.1 0.3 0.6 14.0 18.7 0.3 14 1.9 1.8 0.6
## 3 0.7  9.6 7.1 0.3 0.3 0.2 0.1 0.7 23.0 58.3 0.1 17 2.2 0.7 0.5
## 4 0.2  9.9 6.8 0.4 0.4 0.3 0.4 0.6  2.5  3.9 0.2 24 2.8 1.5 0.3
## 5 0.7  9.1 8.8 0.4 0.3 0.2 0.5 0.7  3.7 20.0 0.2 11 2.3 0.9 1.6
## 6 0.3  9.3 8.7 0.4 0.3 0.1 0.3 0.5  2.0  3.2 0.2 27 2.2 0.7 3.6
```

```
head(owell.chemistry) # Table 2.
```

```
##   well  pH  Eh  TDS  Ca  K Mg  Na HCO3  Cl SO4 NO3   F PO4   TH  TA   TS   SS
## 1    1 7.5 377 1780 269 19 75 338  226 852 302  42 1.1 0.4  977 185 3320 1540
## 2    2 7.4 382 1456 259 20 68 257  183 710 312  41 1.0 0.1  925 150 2946 1490
## 3    3 7.4 378 1471 476 35 66 238  189 710 797  40 1.1 0.1 1460 155 2976 1505
## 4    4 7.5 382 1578 374 17 60 226  220 745 413  39 1.1 0.1 1180 180 3144 1566
## 5    5 7.7 376 1411 291  7 58 191  214 710 178  40 1.1 0.1  966 175 2906 1495
## 6    6 7.8 380 1400 464  3 58 338  159 710 935  40 1.0 0.1 1400 130 2880 1480
##   COD BOD  DO
## 1 0.4 1.1 6.7
## 2 0.2 1.4 6.5
## 3 0.4 1.9 6.6
## 4 0.8 1.5 6.7
## 5 1.0 1.4 7.0
## 6 0.4 1.9 6.1
```

The following tables show the first five entries of the data frame. To have a deeper understand of the data I have made a data dictionary along with a brief summary of the data.

Summary of data

In March 2012 ground water samples were collected from twenty-three different wells along the coastal area of Gulf of Aqaba, Saudi Arabia. Most of the well are privately owned, dug in swallow aquifers and are located in relative close proximity tot eh east coast, except for well 23 which is a deeply dug well.

> "Results of dissolved metals and physicochemical properties of groundwater samples are presented in Table 1 and Table 2. Metal contents in groundwater samples were low throughout the sampling wells and they are within the range listed for waters suitable for drinking water (WHO, 2008). High concentrations of these metals have been found in the adjacent soil samples and geologic units (Table 3 and Table 4). This suggests that the primary source of dissolved metals to groundwater is not probably metals leached from the surrounding rocks and soils, but rather released from aquifer materials (water-rock interaction). It may also suggest that groundwater aquifer is not significantly recharged from surface runoff or the recharge rate from surface water is low or negligible. This is consistent with the low and erratic annual precipitation rate occurred in the region." - (Journal of Applied Science and Agriculture,2013)

Data Dictionary

The following dictionary has been made to better understand the columns names of the two tables. Each value in the table is expressed in μg\L

Table 1

As - Arsenic
B - Boron
Ba - Barium
Be - Beryllium
Cd - Cadmium
Co - Cobalt
Cr - Chromium
Cu - Copper Fe - Iron
Hg - Mercury
Mn - Manganese
Mo - Molybdenum
Pb - Lead
Se - selenium
Zn - Zinc

Table 2

well - The well number
ph - The ph of the well water
Eh - The redox of the well
TDS - Total dissolved solids
Ca - Calcium
K - Potassium
Mg - Magnesium
Na - Sodium
HCO3 - Bicarbonate
Cl - Chlorine
SO4 - Sulfate
NO3 - Nitrate
F - Fluorine Po4 - Phosphate
TH - Total Hardness
TA - Total Alkalinity
TS - Total Solids
SS - Suspended Solids
COD - Chemical Oxygen Demand
BOD - Biological Oxygen Demand
DO - Dissolved Oxygen