Magnesium plus Calcium to Bicarbonate

The areal distribution of the milliequivalent ratio of magnesium plus calcium to bicarbonate ($Mg_{Ca}HCO_3$) in water from permeable zone D ranges from less than 0.01 in southwestern Mississippi to 1,810 in southern Texas (table 1). The $Mg_{Ca}HCO_3$ ratio generally increases from middip to the downdip limit of the data (fig. 17).

From the Sabine arch eastward to the western edge of Florida the $Mg_{Ca}HCO_3$ ratio generally ranges from 0.1 to 1 in the outcrop area, 0.1 to 50 in the middip area, and 1 to more than 50 in downdip areas. From the Sabine arch westward to the San Marcos arch the ratio ranges from 0.1 to 10 in the outcrop and middip areas and from 1 to 100 in downdip areas. From the San Marcos arch southwestward to the Rio Grande the $Mg_{Ca}HCO_3$ ratio ranges from 0.1 in the updip and outcrop area, 10 to 50 near middip, and 50 to 1,000 downdip in southern Texas.

Magnesium plus Calcium to Sodium plus Potassium

The areal distribution of the milliequivalent ratio of magnesium plus calcium to sodium plus potassium ($Mg_{Ca}NaK$) in water from permeable zone D ranges from less than 0.01 in middip areas of southeastern Louisiana to 5.2 in southwestern Louisiana (table 1). The $Mg_{Ca}NaK$ ratio generally decreases from the outcrop to the downdip limit of the data (fig. 18).

From the Sabine arch eastward to the western edge of Florida the $Mg_{Ca}NaK$ ratio generally ranges from 0.05 to 1 along the outcrop and from 0.01 to 0.2 from the outcrop to the downdip limit of the permeable zone except in southwestern Louisiana where the ratio ranges from 0.1 to 5. From the Sabine arch southwestward to the limit of the data, the $Mg_{Ca}NaK$ ratio ranges from 0.1 to 5 along the outcrop and from 0.01 to 1 from the outcrop to the downdip limit of the data except in east Texas where the ratio is about 5.

Bicarbonate to Sulfate

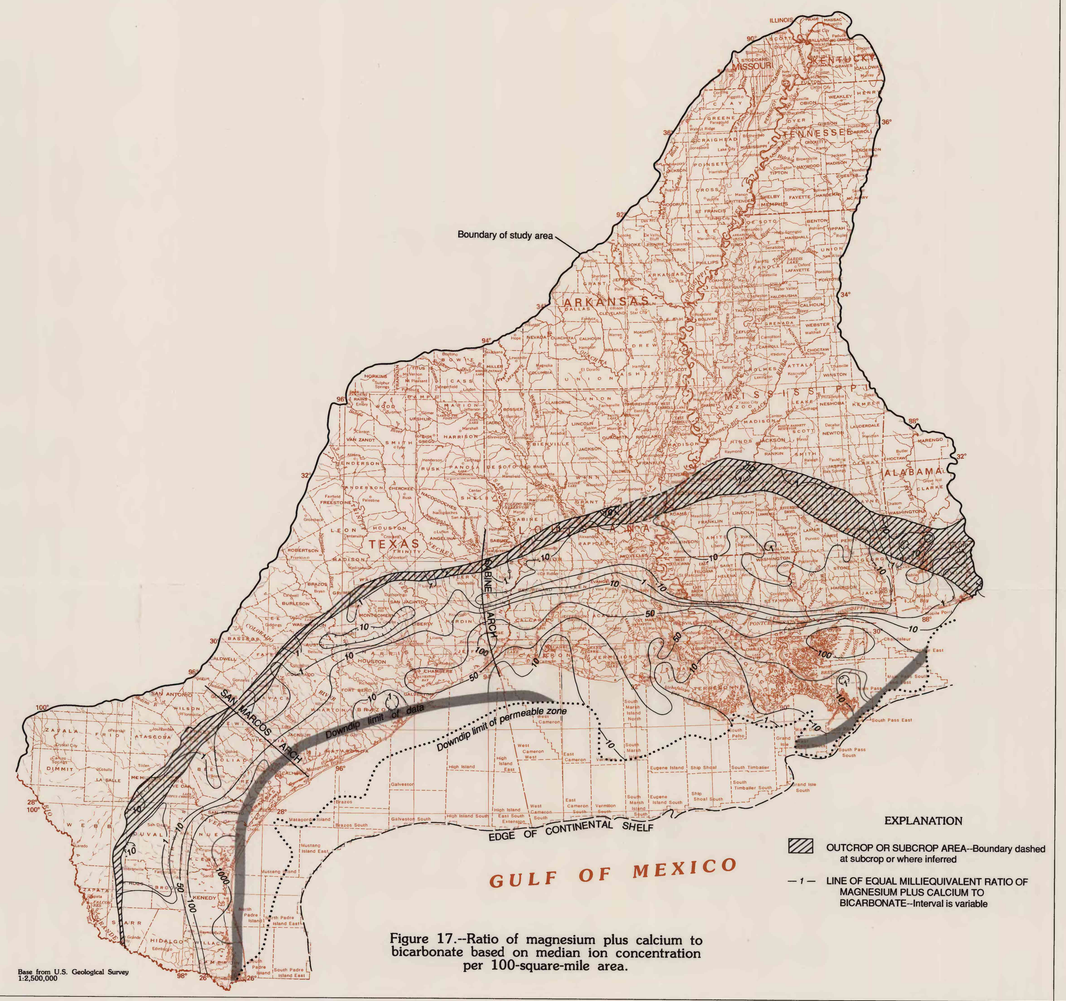
The areal distribution of the milliequivalent ratio of bicarbonate to sulfate (HCO_3SO_4) in water from permeable zone D ranges from 0.02 at the coastline in southern Texas to 1,430 updip in central Louisiana (table 1). The HCO_3SO_4 ratio appears to have no trend but rather randomly distributed low and high values (fig. 19).

From the Sabine arch eastward to the western edge of Florida, the HCO_3SO_4 ratio generally ranges from 1 to 100 along the outcrop and 10 to 100 from the outcrop to the downdip limit except for small areas in southern Louisiana and southwestern Alabama where the ratio is about 1 and areas in central Louisiana and the Continental Shelf where the ratio exceeds 1,000. From the Sabine arch southwestward to the San Marcos arch the HCO_3SO_4 ratio generally ranges from 10 to 100 in the outcrop area and from 1 to 100 in the area from the outcrop to the downdip limit of the data. From the San Marcos arch southwestward to the Rio Grande the HCO_3SO_4 ratio generally ranges from 0.1 to 10 in the outcrop and in the area from the outcrop to the downdip limit of the data.

Bicarbonate to Chloride

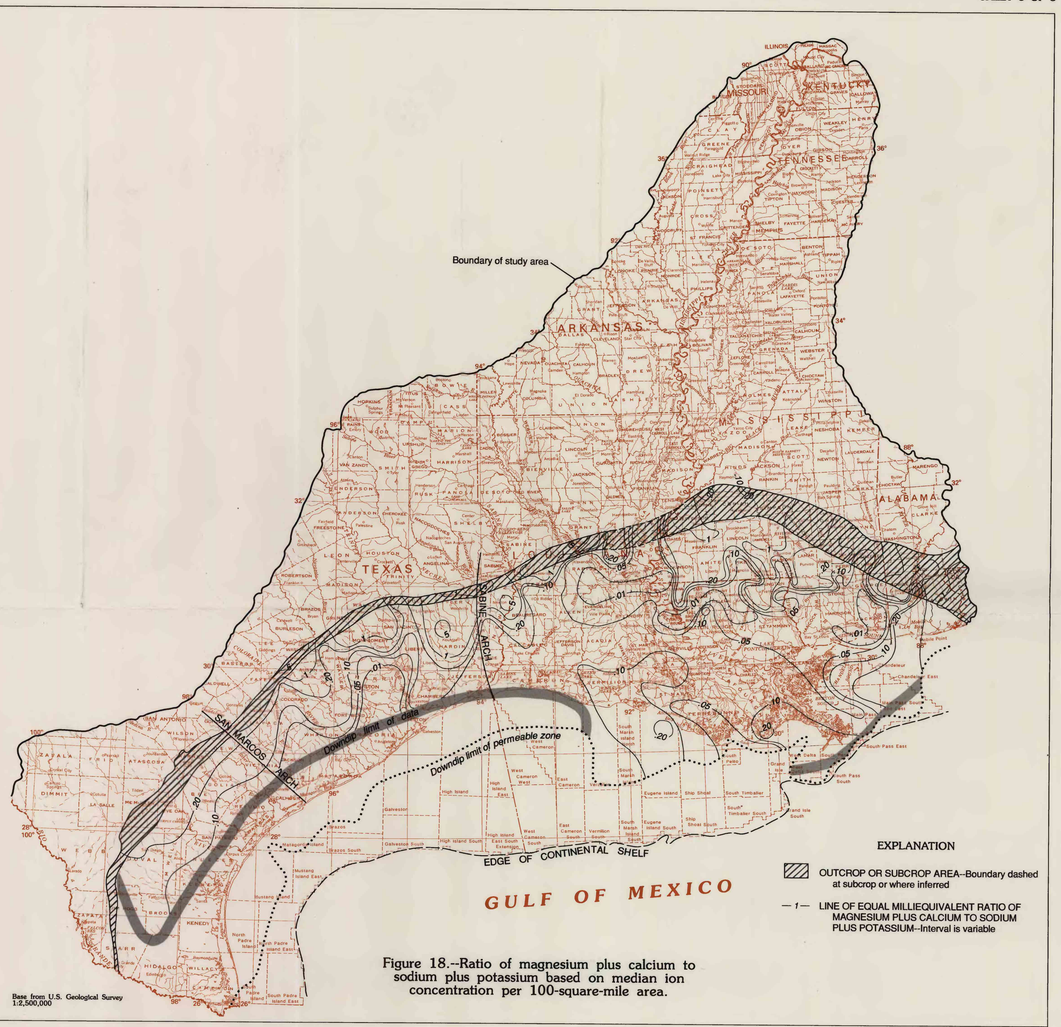
The areal distribution of the milliequivalent ratio of bicarbonate to chloride (HCO_3Cl) in water from permeable zone D ranges from less than 0.01 along the downdip limit of the data in southern Louisiana to 183 in the middip area of southeastern Louisiana (table 1). The HCO_3Cl ratio generally increases from the outcrop to middip and decreases from middip to downdip in the area from the Sabine arch eastward to the western edge of Florida except for the area along the Mississippi River (fig. 20). From the Sabine arch southwestward to the Rio Grande the ratio generally decreases from outcrop to the downdip limit of the data.

From the Sabine arch eastward to the western edge of Florida the HCO_3Cl ratio generally ranges from 1 to 10 in the outcrop area, from 1 to 20 in the middip area, and 0.01 to 1 in the downdip area except along the Mississippi River where it ranges from 1 to 20 in the outcrop area. From the Sabine arch westward to the San Marcos arch the ratio generally ranges from 1 to 5 in the outcrop area, from 0.1 to 5 in the area from outcrop to middip, and from 0.01 to 1 in the area from middip to the downdip limit of the data. From the San Marcos arch southwestward to the Rio Grande the HCO_3Cl ratio is about 1 in the outcrop area and ranges from 0.01 to 1 in the area from the outcrop to the downdip limit of the data.



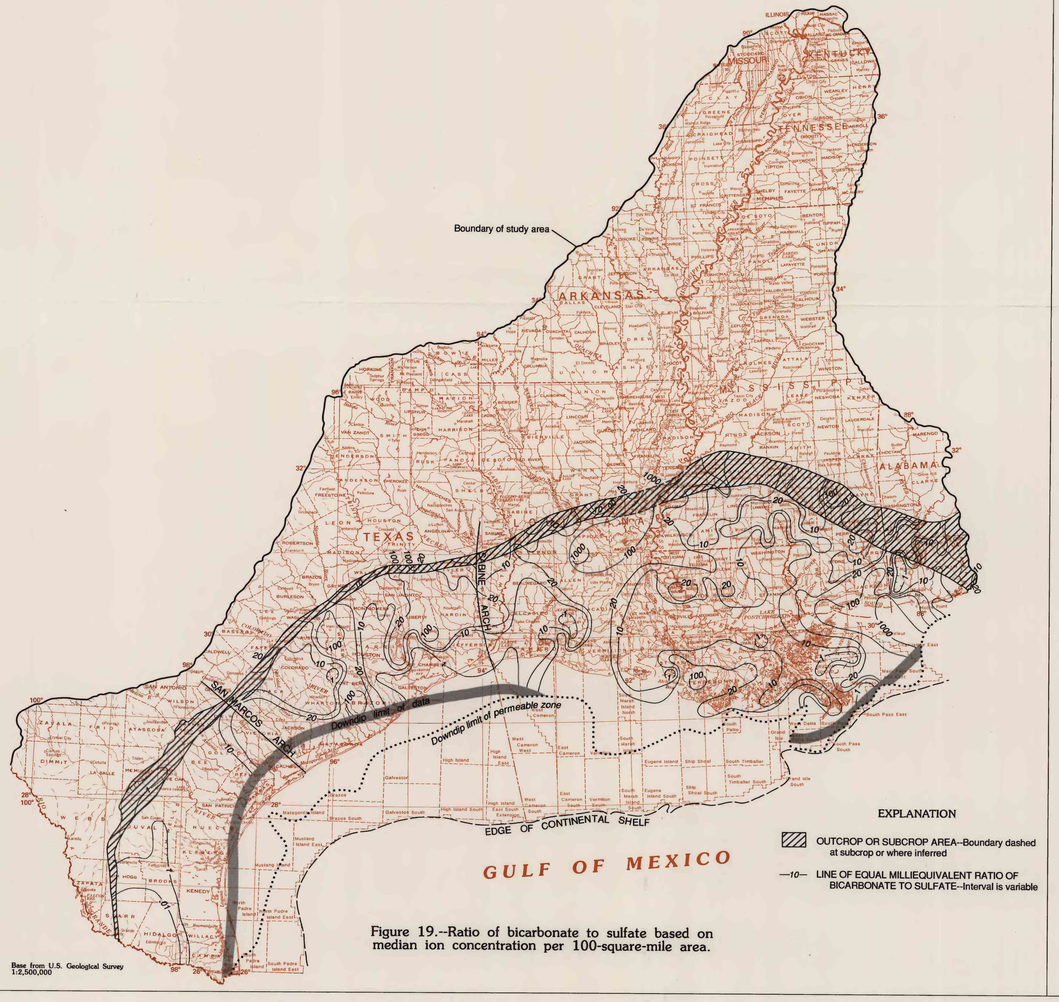
Base from U.S. Geological Survey 1:2,500,000

Figure 17.--Ratio of magnesium plus calcium to bicarbonate based on median ion concentration per 100-square-mile area.



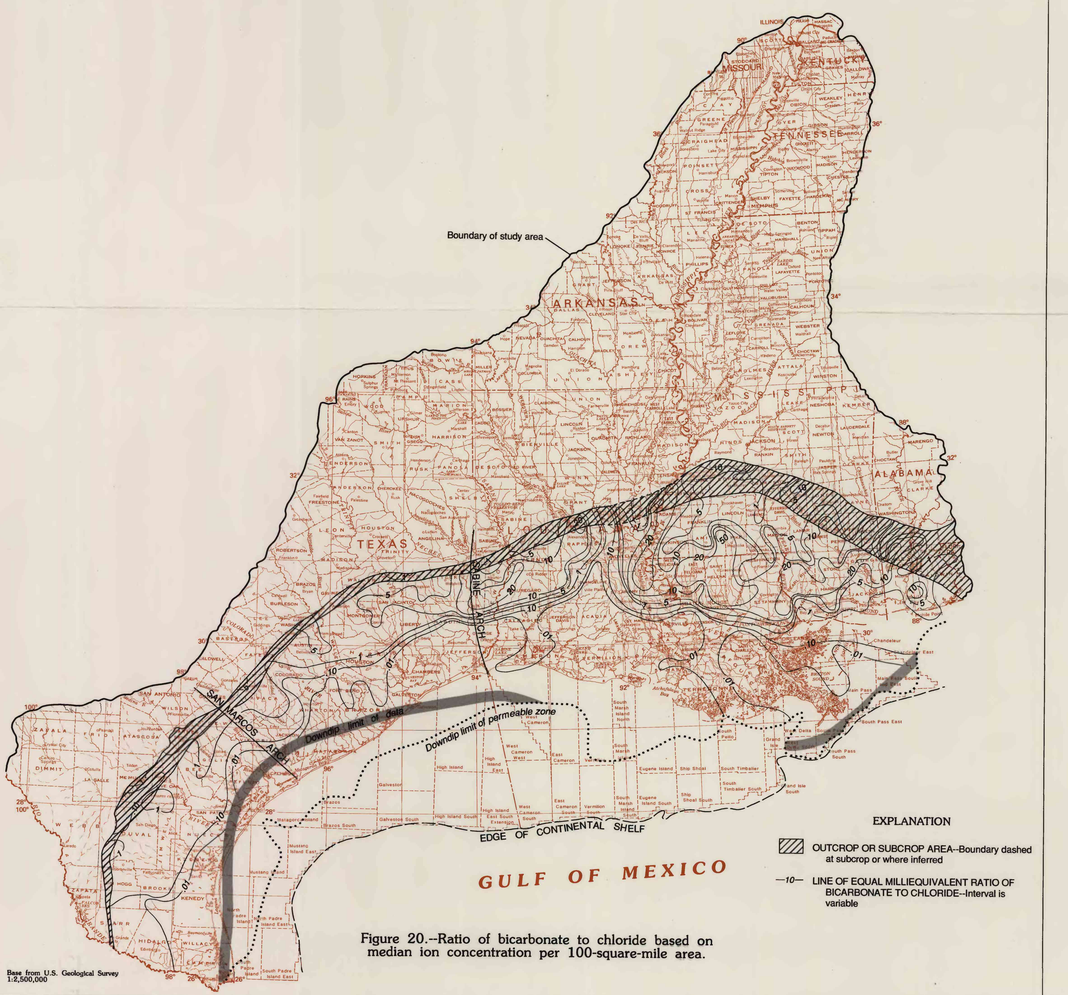
Base from U.S. Geological Survey 1:2,500,000

Figure 18.--Ratio of magnesium plus calcium to sodium plus potassium based on median ion concentration per 100-square-mile area.



Base from U.S. Geological Survey 1:2,500,000

Figure 19.--Ratio of bicarbonate to sulfate based on median ion concentration per 100-square-mile area.



Base from U.S. Geological Survey 1:2,500,000

Figure 20.--Ratio of bicarbonate to chloride based on median ion concentration per 100-square-mile area.

SCALE 1:3 500 000

PROPERTIES AND CHEMICAL CONSTITUENTS IN GROUND WATER FROM PERMEABLE ZONE D (MIDDLE MIOCENE DEPOSITS), COASTAL LOWLANDS AQUIFER SYSTEM, SOUTH-CENTRAL UNITED STATES

by

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