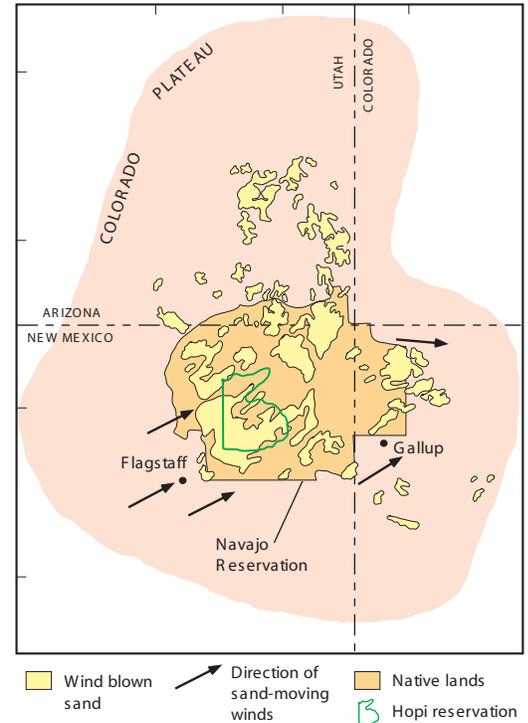


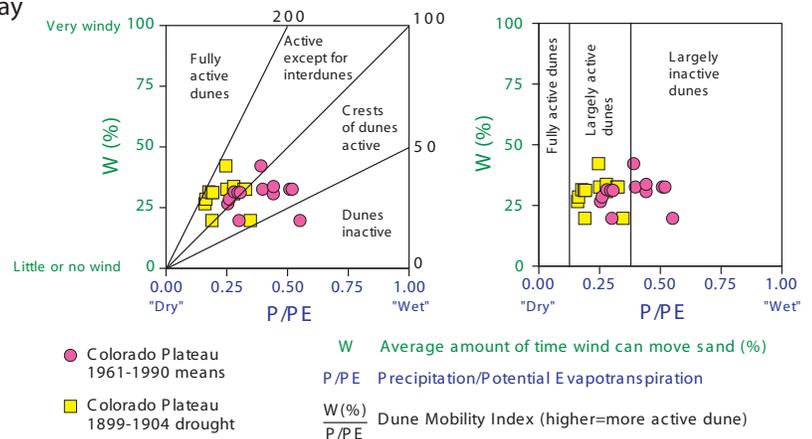
Assessment of sand dunes and the affects of climatic variation on dune mobility in Navajo land

Work by the U.S. Geological Survey includes mapping sand dune deposits that cover one-third of the Navajo Nation, and classifying them according to stability based on the degree and type of vegetation. Sand dune deposits are being examined as indicators of climate change, and the potential of sand dune mobility is being assessed by combining mapping with data gathered on rainfall, temperature, wind speed, dust and sand migration. The final product of the dune-related work will be a map of sand dunes in GIS format, classified into groups based on the degree of vegetation and mobility. This map will provide valuable information to the Navajo Nation, and will be combined with climate information, so that it may be used to predict the potential for sand dune mobilization. Evaluating the present mobility of sand dunes is important for determining potential impacts of climatic variation on grazing and farming resources, native plants, air quality, damage to infrastructure, and health-related impacts from dust storms. (See USGS website <http://geochange.er.usgs.gov/sw/impacts/geology/sand/>)



Sand dunes are sensitive indicators of climate change, including precipitation, soil moisture balance, and wind circulation patterns. They become active during periods of drought, or increased temperature and evaporation, when the plants that are growing on them and holding them in place, die off. The degree of dune mobility can be predicted based on the ratio of precipitation to evapotranspiration.

If we calculate the dune mobility index values for wind speed, precipitation, and potential evapotranspiration (moisture loss) for the Colorado Plateau at present (using average values for 1961-1990), we can see in the graphs below that dunes fall into the category of being partly active, but largely stable, which is what we observe there today (pink dots). If we recalculate the dune mobility index values using data from the 1899-1904 drought, the values are shifted into the category of largely active dunes (yellow squares).



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