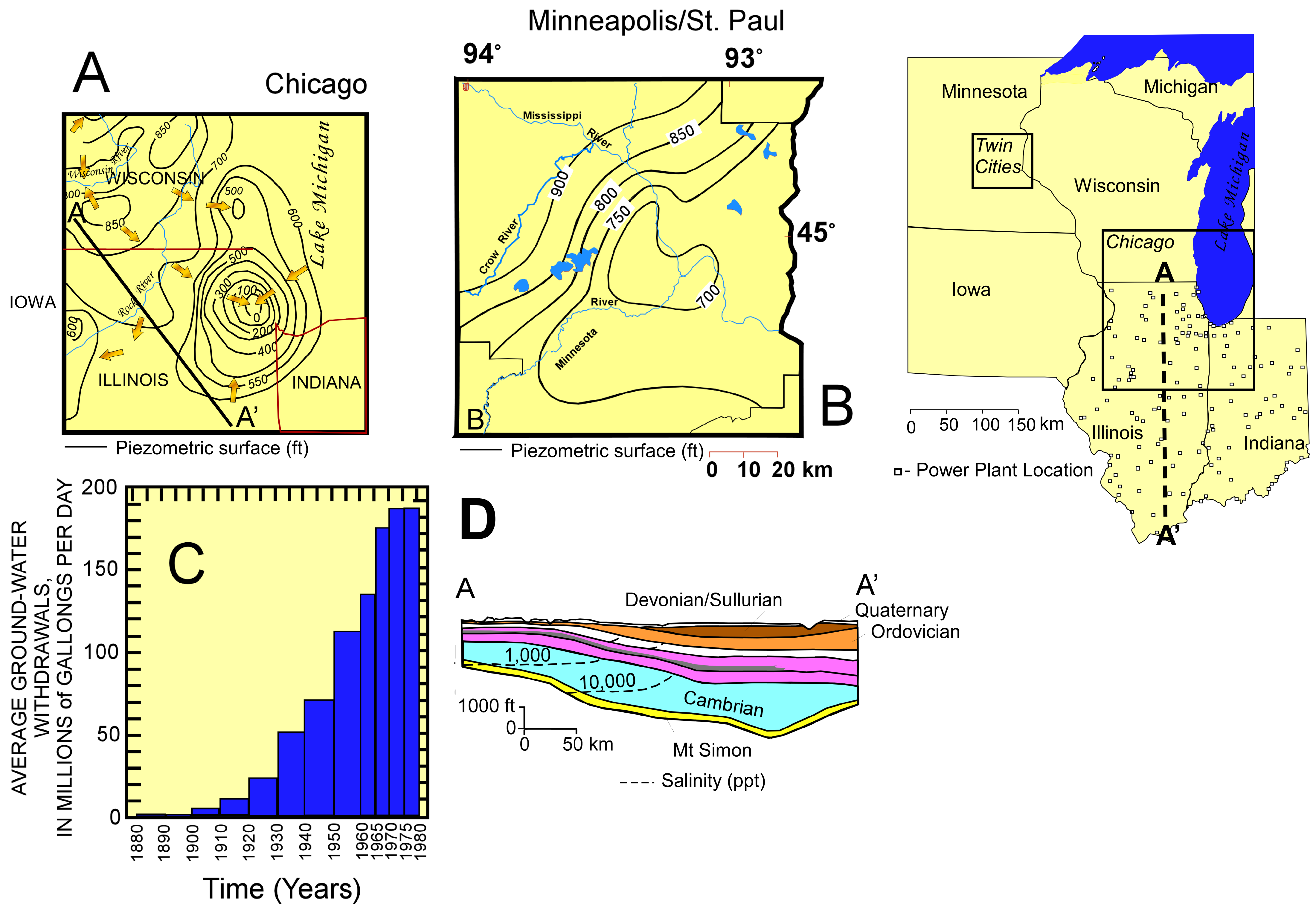


Introduction

Rational For Study:

- 1) The Mt. Simon Formation represents a viable saline water saturated reservoir for CO₂ sequestration in the Illinois basin and environments. It is thick (500 - >2500 ft.) and potentially has sufficient porosity and permeability to store large volumes of CO₂.
- 2) However, freshwater withdraws from the Mt Simon in urban areas (~ 280 Million MT/year) are on the same order of magnitude as CO₂ production across the Illinois Basin (~ 80 Million MT/yr). Freshwater withdraws have had a significant hydrologic Impact (600 ft drawdown in Chicago area) at the regional scale. Will CO₂ injection have a regional scale impact on the hydrology of the system by displacing brine in the regions currently saturated by freshwater?
- 3) High number of wells required to inject 80 Million MT/yr CO₂ may result in well-well interference patterns, high deviatoric pressures (especially in the deep, low-permeability portions of the basin), and displacement of brines into other aquifers.
- 4) We ask the question: Is there an optimal place to locate most of the injection wells across the basin?



Hydrologic Impacts of Freshwater Withdrawals:

- 1) Withdrawal of groundwater (C) in Mt. Simon (B) and Ironton-Galesville A (A) aquifers has resulted in drawdowns of up to 600 ft around Chicago and 150 ft around the Twin Cities of Minneapolis and St. Paul (Lloyd and Lyke, 1995; Olcott, 1992).
- 2) Mt Simon Contains brines deep in the basin (D) but is fresh near the margins. Will CO₂ injection results in displacement of brines into those portions of the aquifer saturated with freshwater? (Lloyd and Lyke, 1995; Olcott, 1992)

