Cours d'hydrogéologie – Illustrations et exercices sur la piézométrie

Aix-Marseille Université

Cartes Piézométriques

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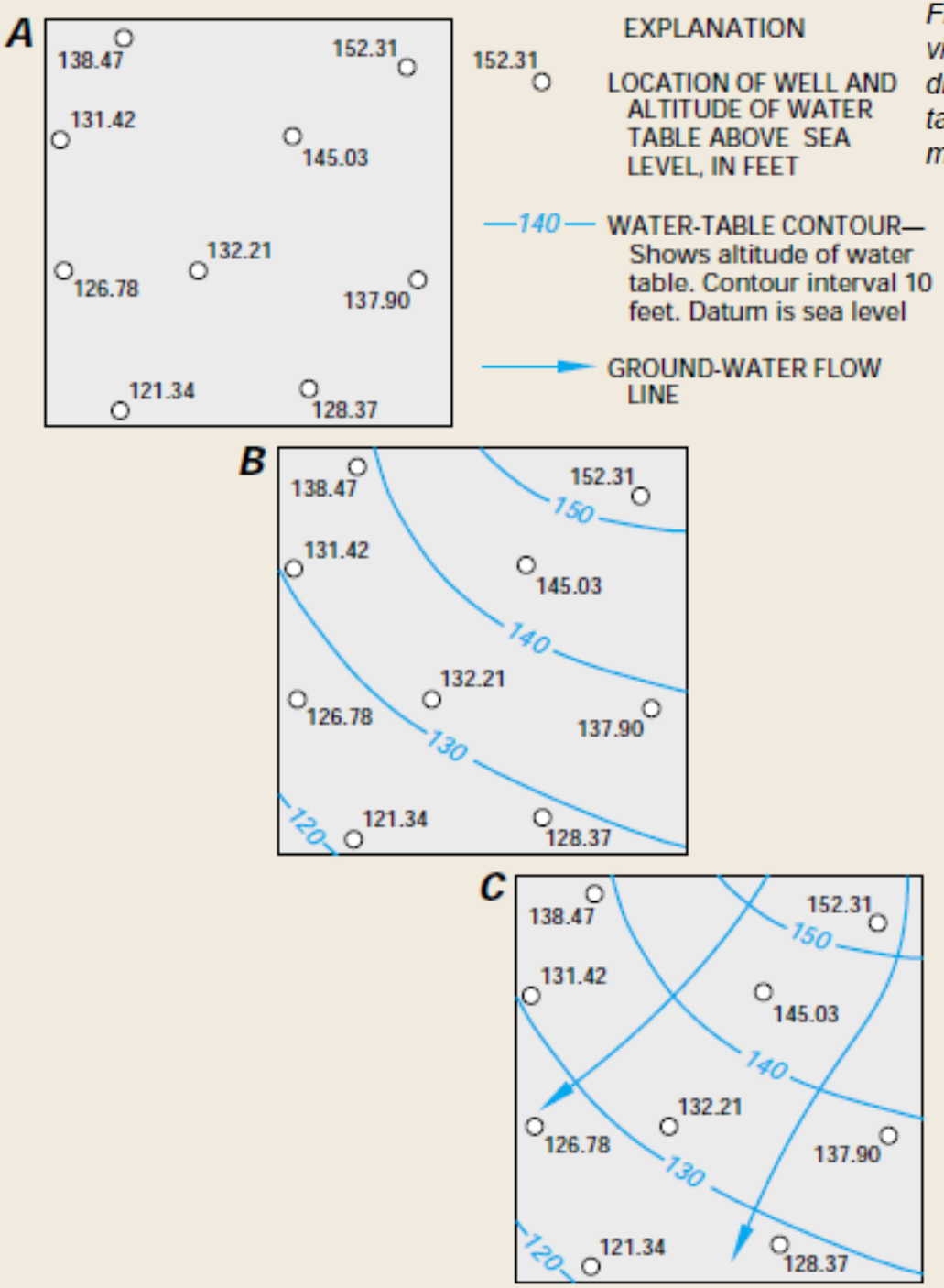
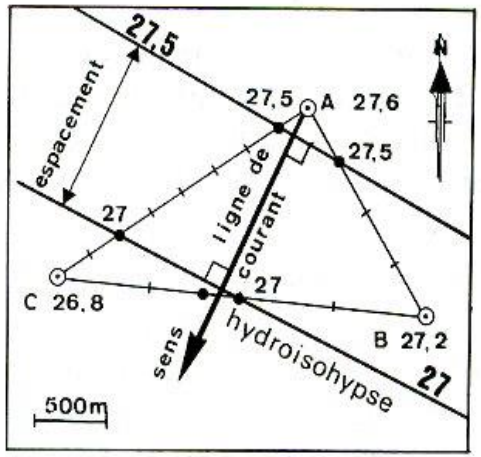


Figure A–2. Using known altitudes of the water table at individual wells (A), contour maps of the water-table surface can be drawn (B), and directions of ground-water flow along the water table can be determined (C) because flow usually is approximately perpendicular to the contours.

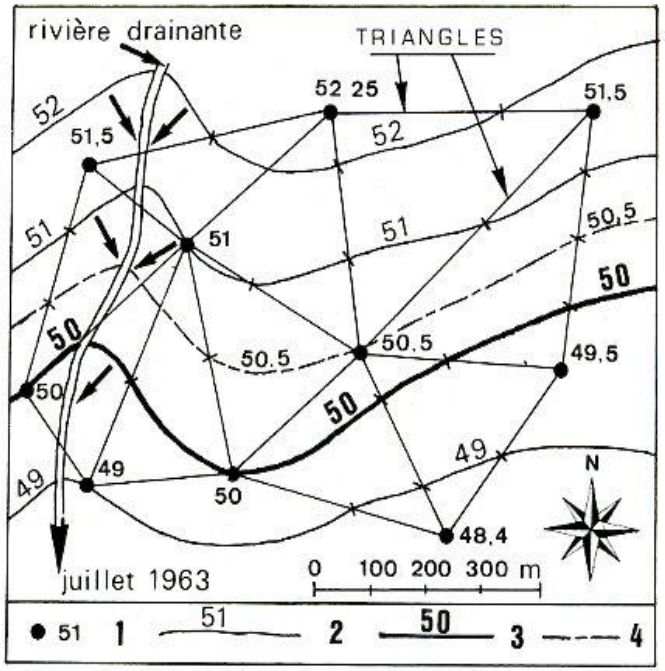
Winter T.C., Harvey J.W., Franke O.L. (1998) - Ground Water and Surface Water A Single Resource. U.S. Geological Survey Circular 1139, Denver, Colorado.

Tracé des courbes hydro-isohypses

Interpolation linéaire

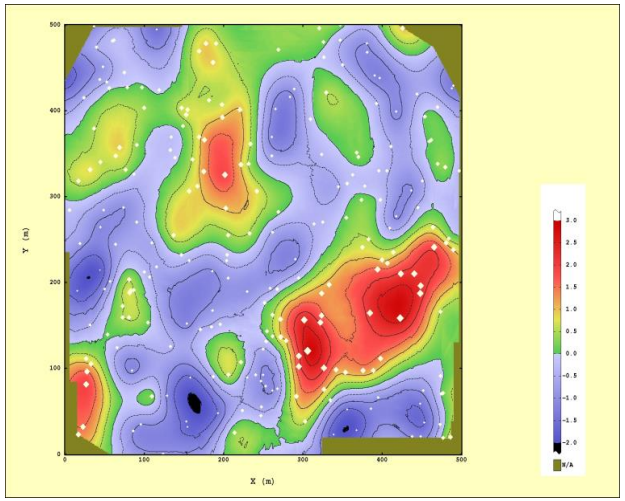


Castany

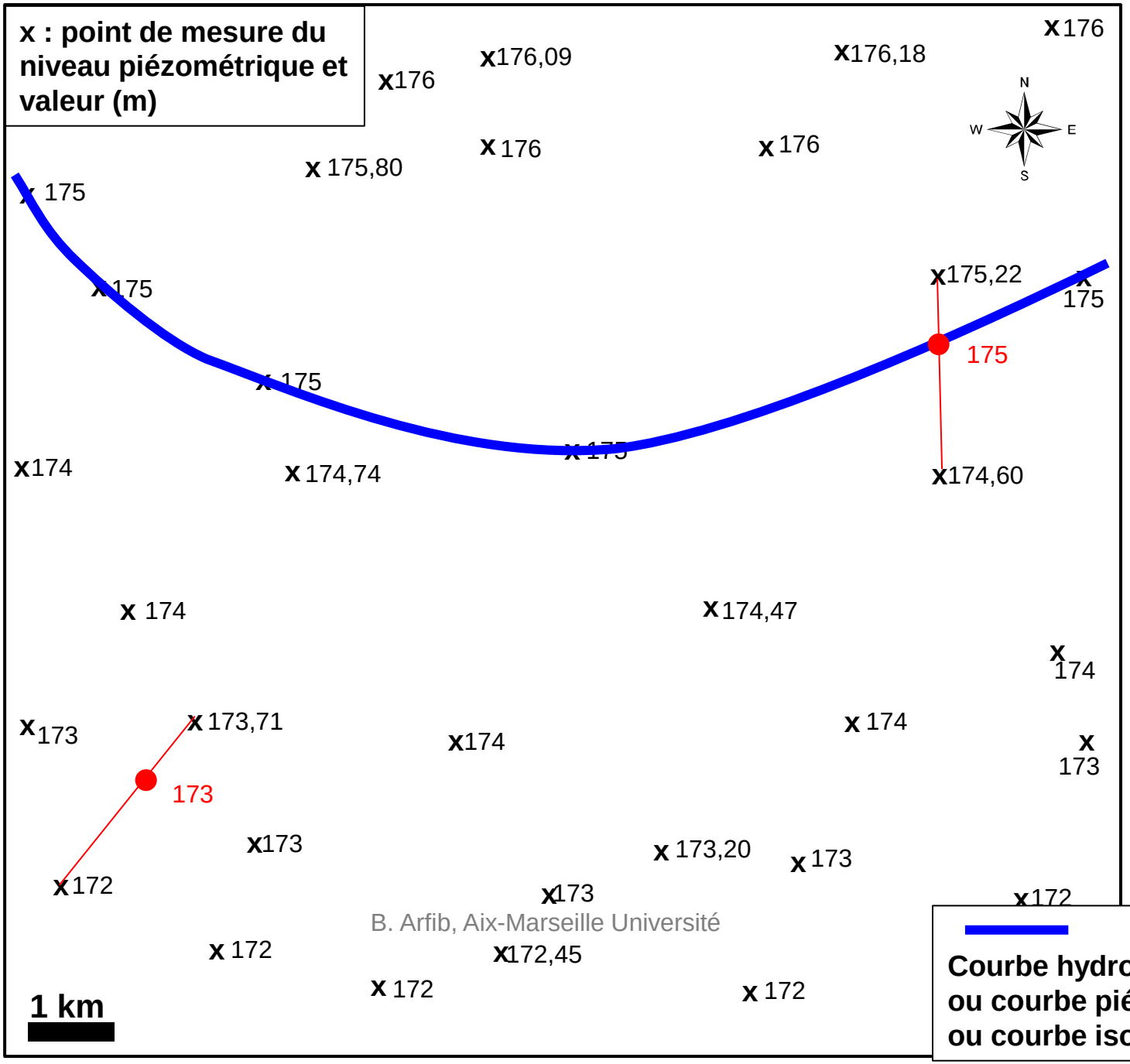


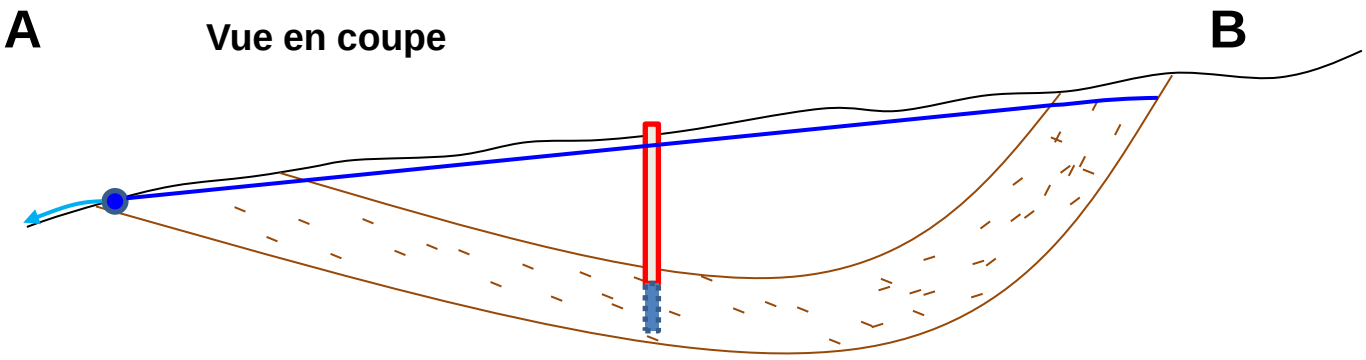
Interpolation par méthode géostatistique

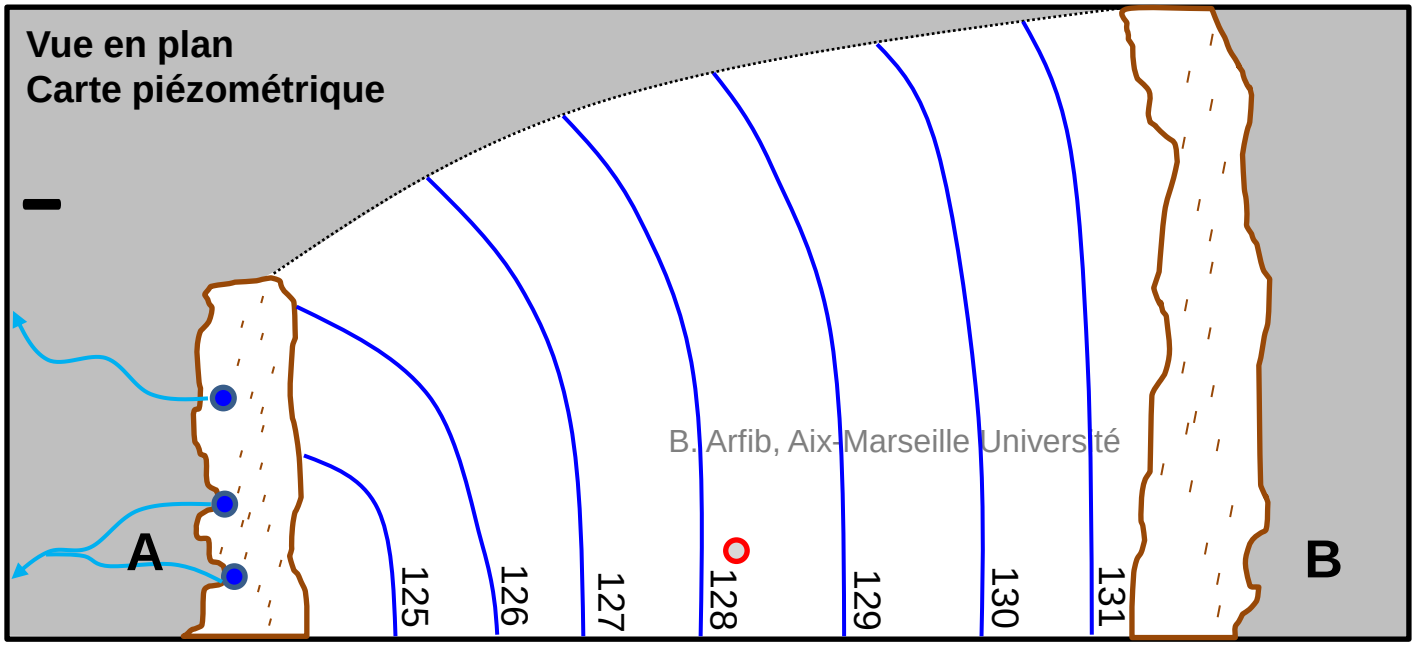
Le krigeage est, en géostatistique, la méthode d'estimation linéaire garantissant le minimum de variance. Le krigeage réalise l'interpolation spatiale d'une variable régionalisée par calcul de l'espérance mathématique d'une variable aléatoire, utilisant l'interprétation et la modélisation du variogramme expérimental. C'est le meilleur estimateur linéaire non-biaisé ; il se fonde sur une méthode objective. Il tient compte non seulement de la distance entre les données et le point d'estimation, mais également des distances entre les données deux-à-deux. (wikipedia)



Carte piézométrique (Nappe libre de la Durance, mesures effectuées le 13/09/1997)







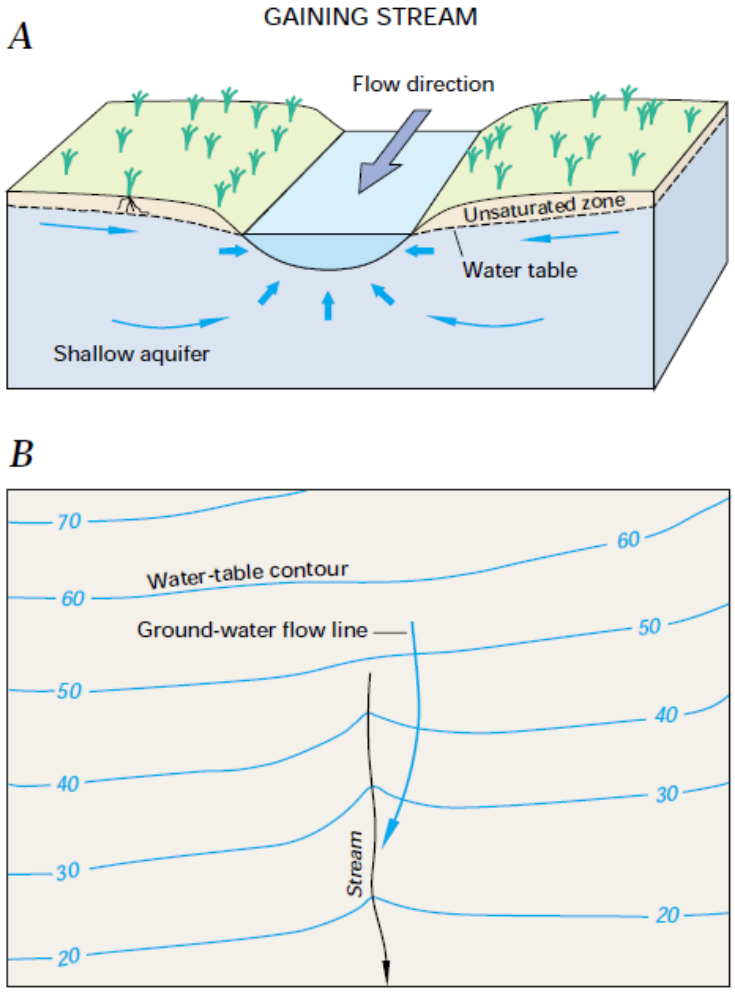


Figure 8. Gaining streams receive water from the ground-water system (A). This can be determined from water-table contour maps because the contour lines point in the upstream direction where they cross the stream (B).

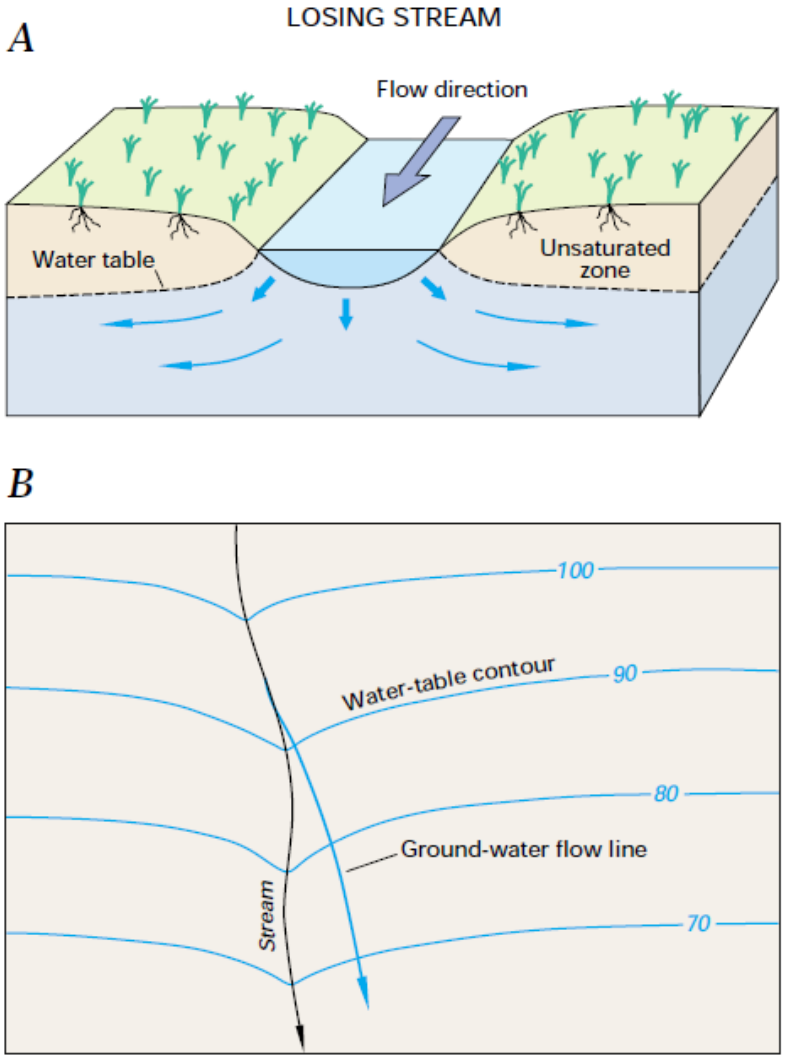


Figure 9. Losing streams lose water to the ground-water system (A). This can be determined from water-table contour maps because the contour lines point in the downstream direction where they cross the stream (B).

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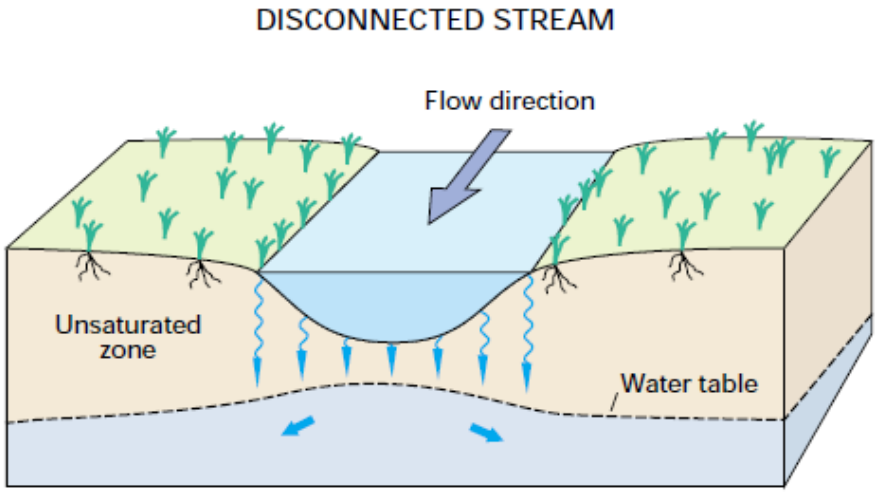

*Figure **10.** Disconnected streams are separated from the ground-water system by an unsaturated zone.*

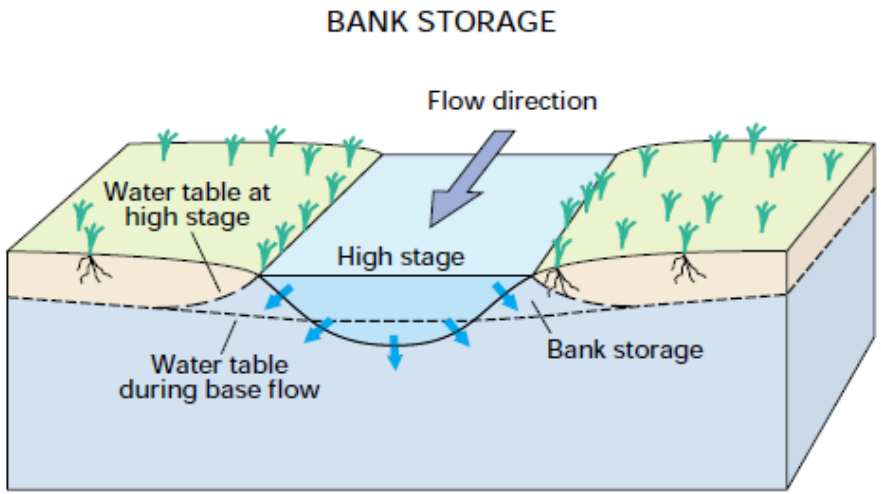

*Figure **11.** If stream levels rise higher than adjacent ground-water levels, stream water moves into the streambanks as bank storage.*

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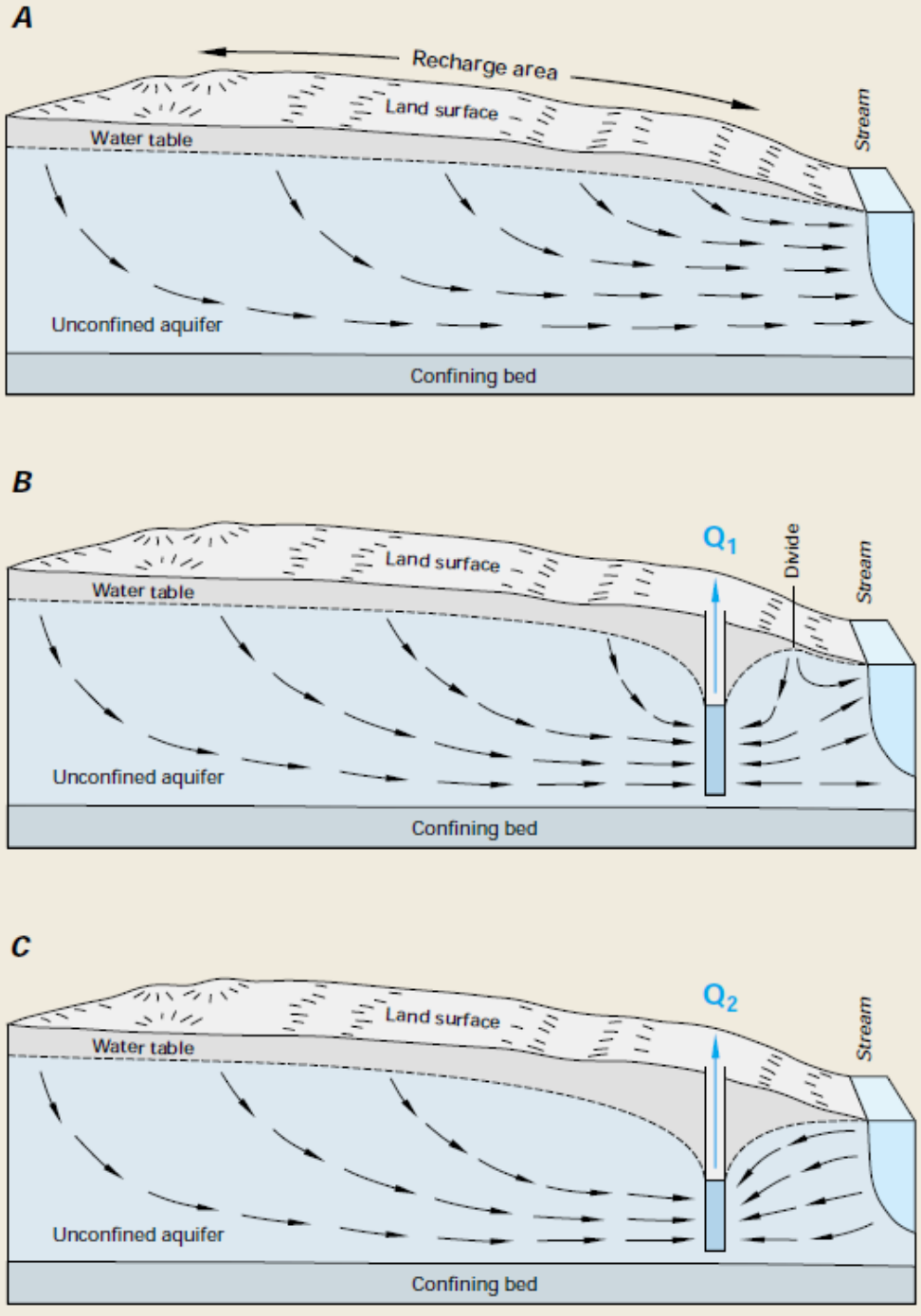

Figure C–1. In a schematic hydrologic setting where ground water discharges to a stream under natural conditions (A), placement of a well pumping at a rate (Q_1) near the stream will intercept part of the ground water that would have discharged to the stream (B). If the well is pumped at an even greater rate (Q_2), it can intercept additional water that would have discharged to the stream in the vicinity of the well and can draw water from the stream to the well (C).

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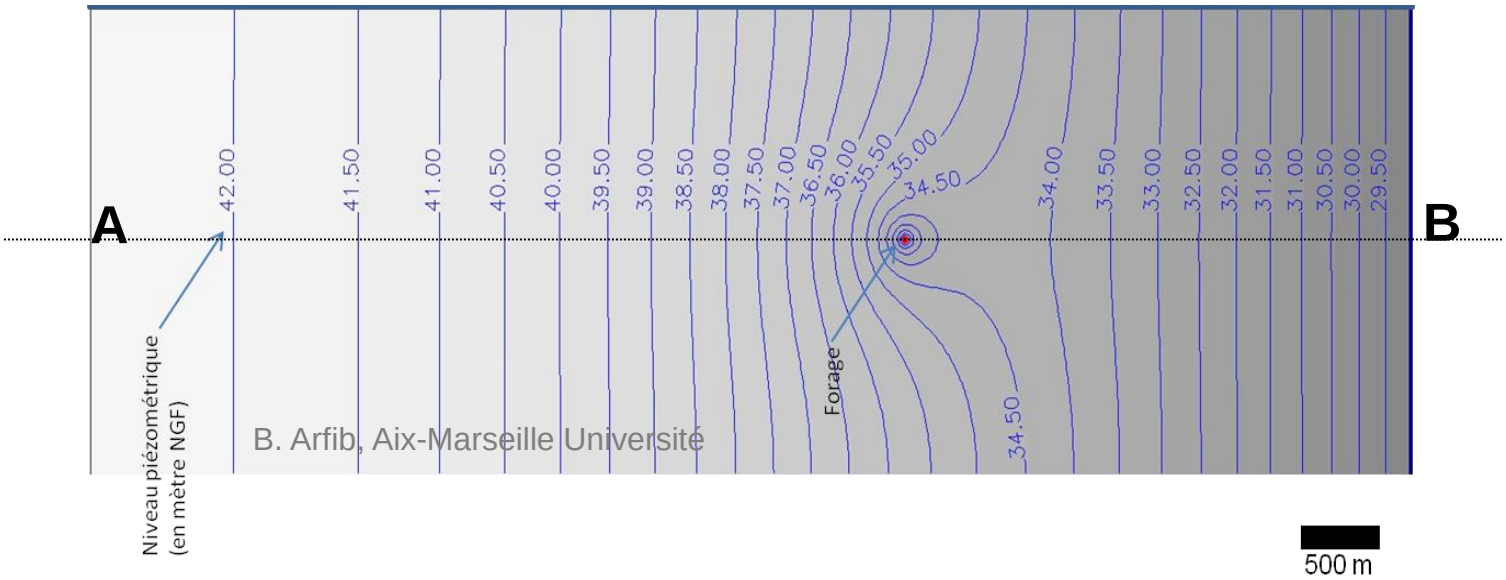
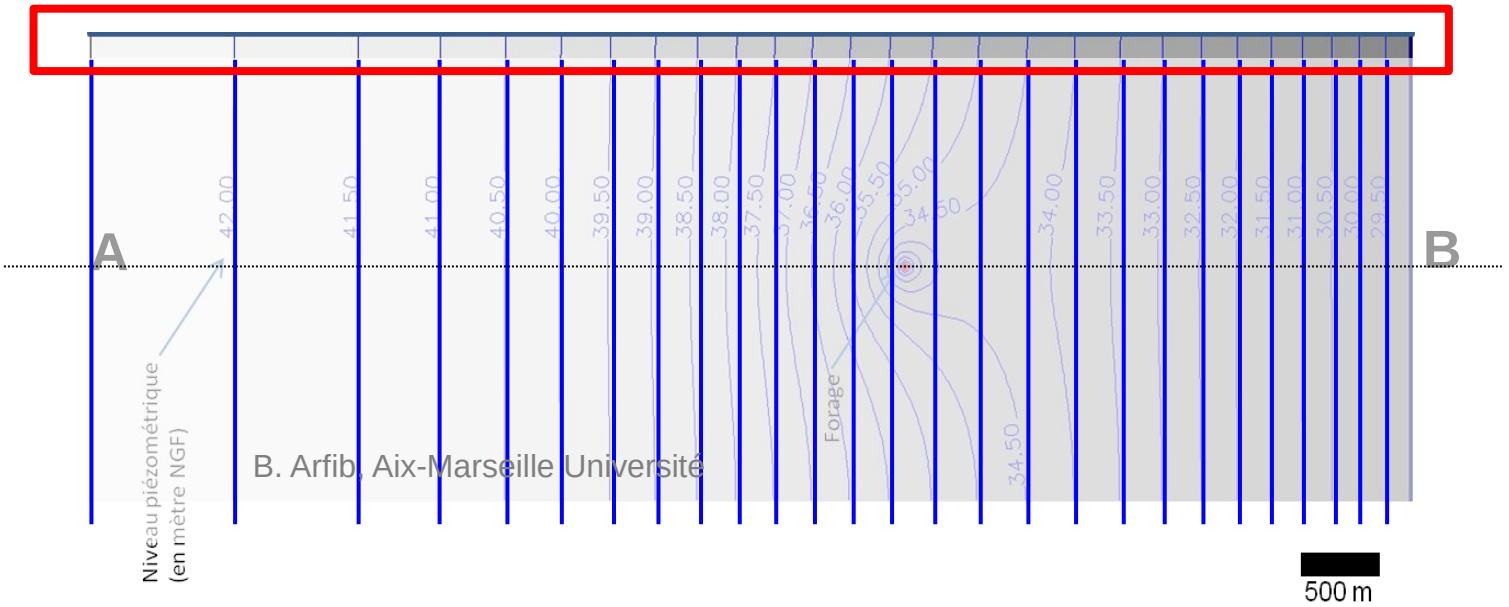
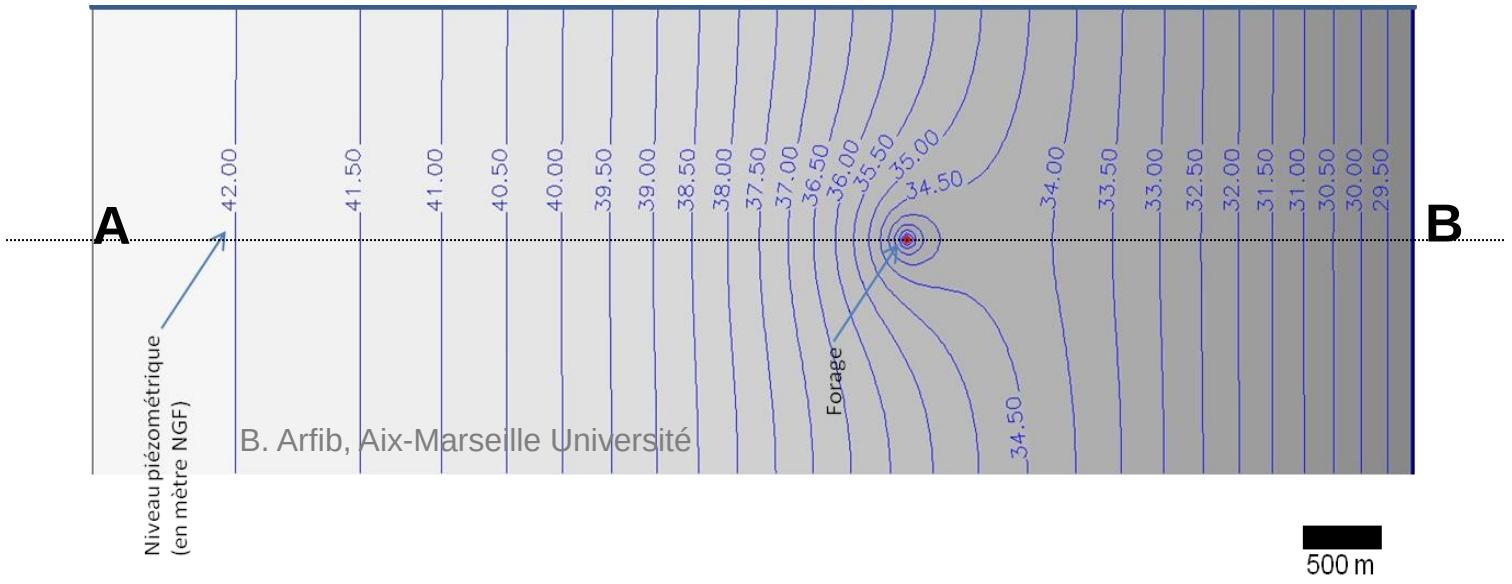
Effet du prélèvement sur un forage

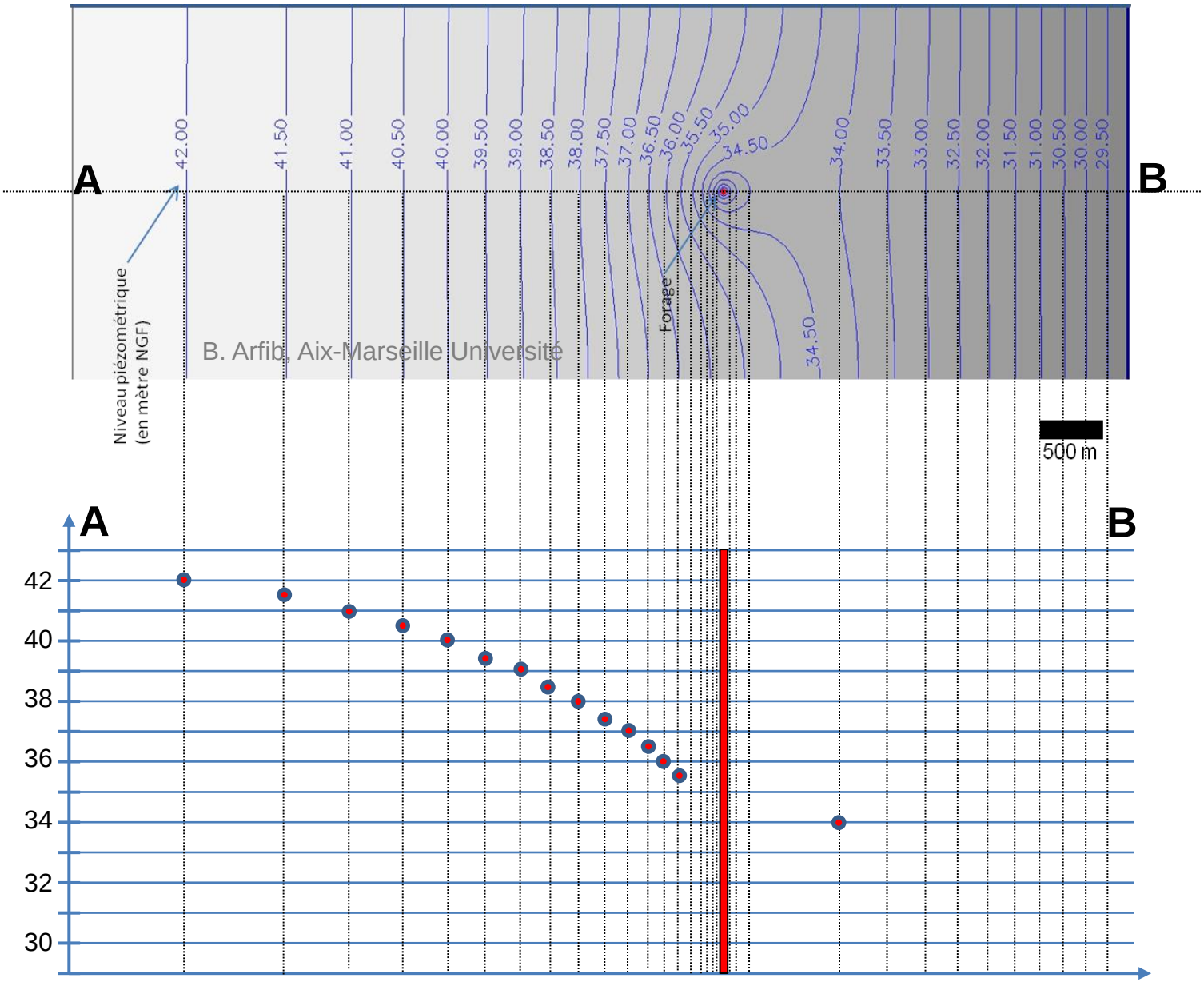


Effet du prélèvement sur un forage / carte sans prélèvement





Effet du prélèvement sur un forage



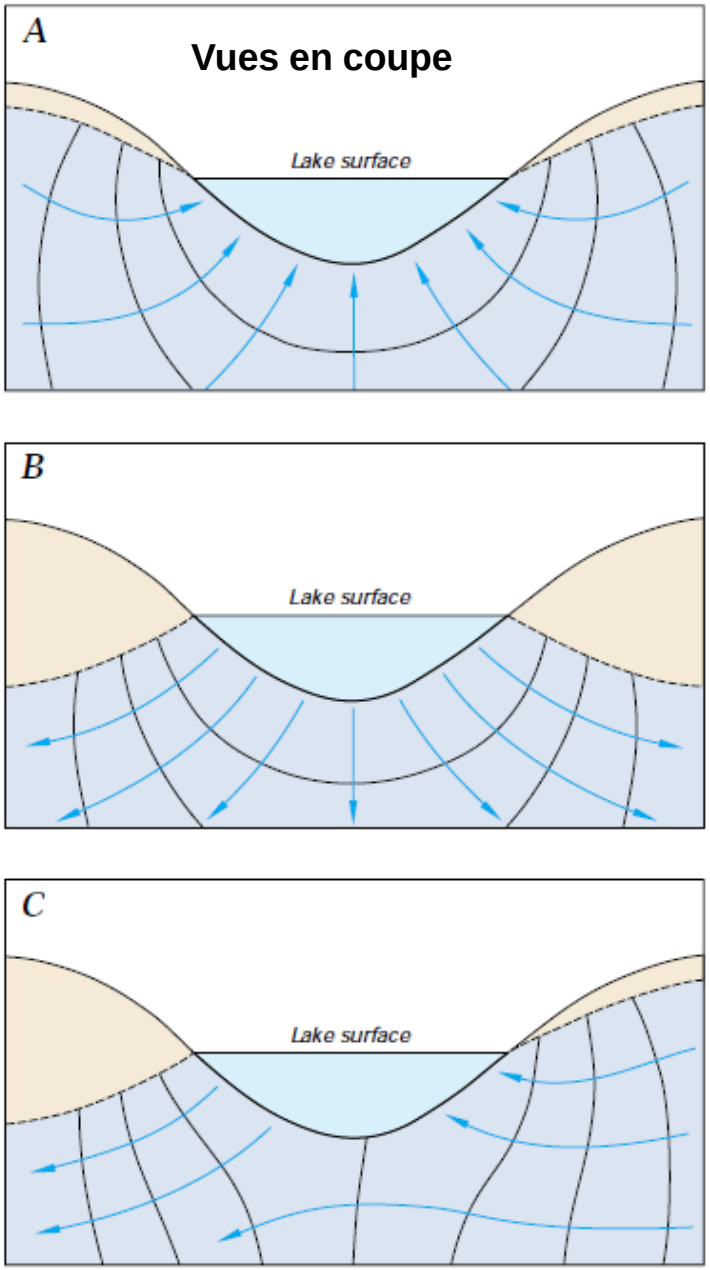


Figure 16. Lakes can receive ground-water inflow (A), lose water as seepage to ground water (B), or both

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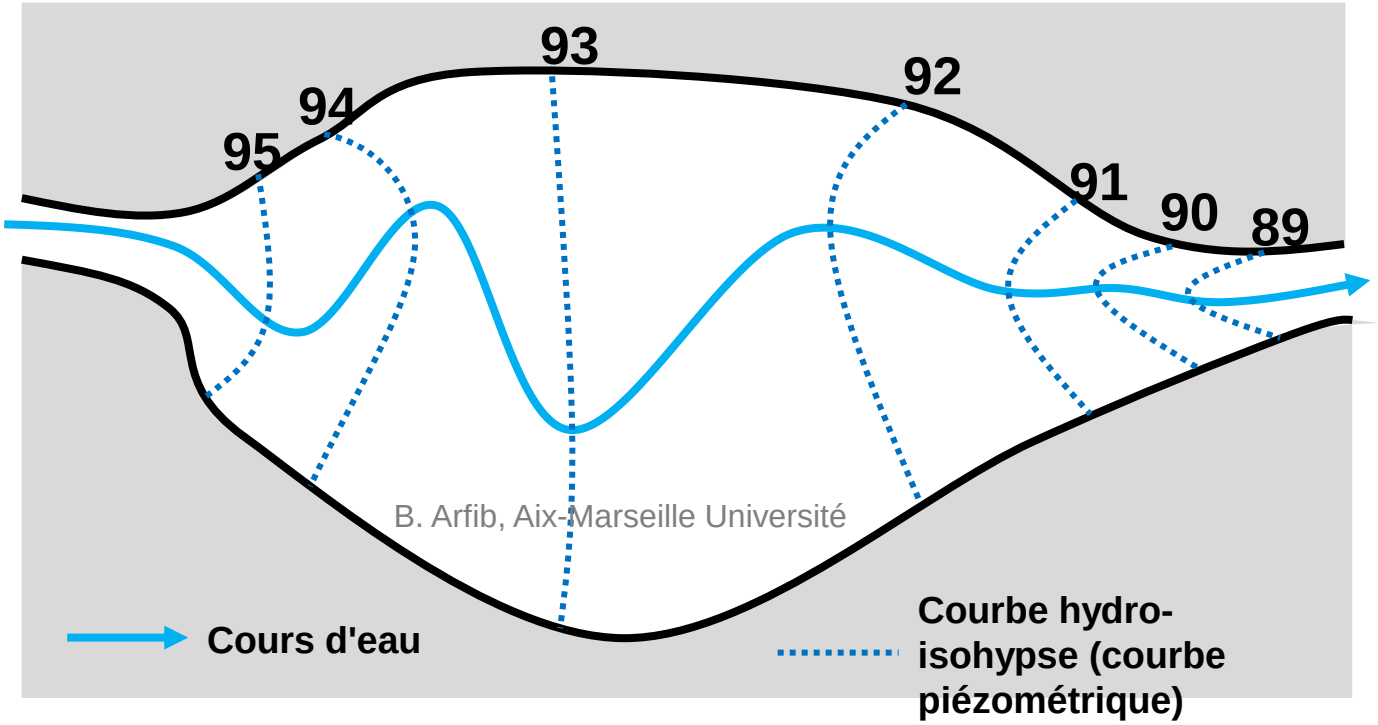
Nappe libre alluviale, en relation avec la rivière



+ rivière = Limite à charge imposée (condition de Dirichlet)

Limite à flux imposé (condition de Neumann)
Cas particulier : flux nul