**Integrated simulation of consumptive use and land subsidence in the Central Valley, California, for the past and for a future subject to urbanization and climate change**

**R. T. HANSON**$^1$, **A. L. FLINT**$^2$, **L. E. FLINT**$^2$, **C. C. FAUNT**$^1$, **WOLFGANG SCHMID**$^3$, **M. D. DETTINGER**$^4$, **S. A. LEAKE**$^5$ & **D. R. CAYAN**$^4$

$^1$ USGS, 4165 Spruance Rd., Suite 200, San Diego, California 92101, USA
$^2$ USGS, 6000 J St, Placer Hall, Bldg 56, Sacramento California 95619A, USA
$^3$ Dept Hydrology and Water Resources, University of Arizona, 1133 E James E. Rogers Way, Tucson, Arizona 85721, USA
$^4$ USGS/SIO, 201 Nierenberg Hall, La Jolla, California 92093, USA
$^5$ USGS, 520 North Park Avenue, Tucson, Arizona 85719, USA

**Abstract** Competition for water resources is growing throughout California, particularly in the Central Valley where about 20% of all groundwater used in the United States of America is consumed for agriculture and urban water supply. Continued agricultural use coupled with urban growth and potential climate change would result in continued depletion of groundwater storage and associated land subsidence throughout the Central Valley. For 1962–2003, an estimated 1230 hectametres (hm$^3$) of water was withdrawn from fine-grained beds, resulting in more than three metres (m) of additional land subsidence locally. Linked physically-based, supply-constrained and demand-driven hydrological models were used to simulate future hydrological conditions under the A2 climate projection scenario that assumes continued “business as usual” greenhouse gas emissions. Results indicate an increased subsidence in the second half of the twenty-first century. Potential simulated land subsidence extends into urban areas and the eastern side of the valley where future surface-water deliveries may be depleted.

**Key words** groundwater; climate change; hydrological model; land subsidence