episodische Kontrollmessungen durchgeführt wurden. Die zeitliche Auflösung der Berechnun-gen erfolgte auf Tagesbasis für den Zeitraum 1994 bis 2007.
Stationäre räumliche Inputdaten für das Modell sind der digitalen 10x10 m-Höhenraster des BEV, Landnutzungsverteilung und Blattflächenindex (Ermittlung mittels Fernerkundungsmethoden) und Pedohydrotope (ähnliche bodenphysikalischen Eigenschaften). Zeitlich und räumlich variierende Inputdaten sind mittels der Gradientenmethode regionalisierte Niederschläge, vegetationsbezogene Referenzverdunstung und Lufttemperaturen.
Zur Beschreibung der Wasserbewegung in der ungesättigten Zone wird das physikalisch basierte Modell um konzeptionelle Ansätze erweitert. Daraus ergeben sich zusätzlich zu bestimmende Parameter. Dies erfolgt durch Kalibrierung aus den gemessenen Abflüssen, den Zusatzinformationen aus den karsthydrologischen und isotopenhydrologischen Untersuchungen und einer Überprüfung der daraus abgeleiteten Modellvorstellung.
Der überwiegend intensiv verkarstete Felsuntergrund ist geprägt von Röhren- und Kluftsystemen, in denen ein Teil des Niederschlagswassers sehr rasch durch den Untergrund zum Abfluss gelangt. Um diesen Prozess im Modell zu beschreiben, wird ein Bypass-Fluss eingeführt, der die Bodenmatrix überbrückt und einen Teil des Niederschlages unmittelbar in die gesättigte Zone leitet. Die beobachteten Quellschüttungen bestätigen diesen signifikanten Prozess. Zur Kalibrierung des Modells wurden gemessene Abflussganglinien herangezogen.
Durch Vergleich der gemessenen Abflüsse mit den simulierten Werten konnten in Anlehnung an ein früheres Modellkonzept Defizite und Überschüsse ermittelt werden und unter Einbeziehung des Höheneffektes des stabilen Isotops Sauerstoff-18, früherer Markierungsversuche und der geologisch-tektonischen Situation ein Konzeptmodell der Karstentwässerung mit Abschätzung unterirdischer Entwässerungsrichtungen entwickelt werden, das eine wichtige Basis für Ressourcenbewertung und -schutz darstellt.

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## A giant early Miocene sunfish from the North Alpine Foreland Basin and its implication for molid phylogeny

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The Molidae Ranzani, 1839 comprise a family of ocean sunfishes and represent the largest extant bony fishes, reaching lengths of over 3 m. All known Molidae are characterized by a stout, truncated shape, with a body that ends rather abruptly just behind the dorsal and anal fins. They are epipelagic and are distributed worldwide in tropical to temperate seas. Due to their largely cartilaginous, weakly ossified and spongy skeleton, the fossil record of the Molidae is very poor. Representatives of the family Molidae are mostly represented by isolated jaws and dermal scale plates. Complete skeletons even of modern sunfishes are rare in museum collections and, unsurprisingly, no complete Molidae skeletons have been reported so far in the fossil record. Consequently, the record of three fossil Molidae skeletons, found by private collectors during construction work for a hydroelectric power plant near Pucking in spring 1980, is extremely outstanding. The specimens were associated with a complete dolphin skeleton, numerous small teleost fishes and scattered lucinid bivalves along with a diverse algal- and leaf flora. The pelitic deposits are part of the Ebelsberg Formation and are dated as Aquitanian (lower part of nannoplankton Zone NN2) based on the presence of *Helicosphaera scissura* and *Helicosphaera sellii* and the absence of *Helicosphaera ampliaperta*. In terms of regional stages, the deposits are part of the upper Egerian stage and are ca. 22 Ma old. During that time, the area was part of the Central Paratethys Sea, and the North Alpine Foreland Basin was covered by a deep sea. The section was situated on the northern shelf of that sea within the outer neritic zone.
The skeletons represent the the oldest known modern-type sunfish, which will be described as the new genus *Austromola*. A giant size of more than 320 cm body length and 400 cm maximum diameter can be calculated based on linear extrapolation of morphometric parameters of recent *Mola mola*. Thus, this early Miocene Molidae was the largest sunfish known so far. Phylogenetic analysis shows that it forms a sister-clade of *Ranzania* together with *Mola* and *Masturus*. Therefore, its Aquitanian age suggests an Oligocene age for the origin of *Ranzania* and an at least early Oligocene age for the last common ancestor of the extant Molidae. The radiation of the (*Austromola* (*Mola*+ *Masturus*)) clade occurred soon thereafter during the Early Miocene and, consequently, oldest *Mola* fossils turn up in Middle Miocene deposits. The huge gap of c. 20 Ma between the basal molid *Eomala* and the giant *Austromola* and the lack of *Masturus*-fossils in Miocene to Pleistocene deposits emphasise the extremely spotty fossil record of the sunfishes, which usually are docu-mented solely by isolated jaw elements or scale plates. Thus, the three more or less complete skeletons from the deep water deposits of Upper Austria are an outstanding and unparalleled finding.

## Faunal diversity, gradients and interrelations in Neogene Lake Systems of Central and South-Eastern Europe

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The gastropod γ-diversity of 12 Neogene lake systems is evaluated. In total, 1184 gastropod taxa from 119 localities are recorded deriving from the Early Miocene *Rzehakia* Lake System, the Early to Middle Miocene Dinarid Lake System, Lake Skopje, the Paratethyan Sarmatian lakes and the South German lakes, the Late Miocene Lake Pannon, the Pliocene lakes Dacia, Transylvania, Slavonia, Kosovo and Šoštanj as well as the Holocene Lake Petea. Each lake system is characterised according to its faunistic inventory and endemism. Many papers dealing with extant mollusc faunas of Eurasian aquatic systems refer to Lake Pannon when explaining extant biogeographic distributions and phylogenetic relations. Our dataset, however, points to a much more complex history of the faunas reaching back at least to the Early Miocene. High endemisms and low inter-lake relations of the Early and early Middle Miocene lake systems suggest that these experienced the first autochthonous evolutionary pulses. Many genera display their FADs in these systems (e.g. *Marticia, Kosovia, Orygoceras, Pyrgula, Dianella, Emmericia*). This pattern changed at the Middle/Late Miocene boundary when Lake Pannon inherited numerous species which evolved prior in the Sarmatian Paratethyan lakes. On the generic level, parts of the Lake Pannon fauna can be traced back even to the Early Miocene faunas of the Dinarid Lake System. The combined effect of heritage and new radiations in a geochemically unique aquatic system