



International Meeting of First Human Settlements in Eurasia, Shanghai, Oct. 8-10, 2010

Early Pleistocene hominin dispersals in Eurasia: East-West or North-South? The small vertebrate approach

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FIRST PARAGRAPH: In addition to Dmanisi in Georgia and the Atapuerca karstic complex in central Spain, the Guadix-Baza Basin (Granada, SE Spain) plays an outstanding role in the understanding of the how and when of the early human settlement of Europe. This basin records the oldest presence of early Pleistocene hominids in Western Europe, as evidenced by the thousands of Mode 1 lithic tools from the sites of Barranco León and Fuente Nueva 3. Moreover, as a difference with the Atapuerca karstic complex, the Guadix-Baza Basin is composed of a complete sequence of fluvial and lacustrine sediments that ranges from the latest Miocene to the late middle Pleistocene. Particularly significant is the Pliocene-Pleistocene record in the Baza sub-basin, composed of fluvial and lacustrine sediments which have yielded dozens of large and small vertebrate fossiliferous levels, including amphibians, squamates, insectivores, rodents and lagomorphs.

欧亚大陆早更新世人类的扩散：东西向还是南北向？根据小型脊椎动物分析

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首节: 除了格鲁吉亚的德曼尼西和西班牙中部的阿塔坡卡岩溶组合, 西班牙东南部格兰纳达的瓜蒂克斯-巴扎盆地对于了解早期人类何时如何在欧洲定居也至关重要。这一盆地有着欧洲西部早更新世人类最早的记录, 其证据包括狮子谷和新源头 3 遗址出土的数千件第一模式的石器工具。另外, 与阿塔坡卡不同, 瓜-巴盆地有完整的河湖沉积序列, 从晚中新世一直到中更新世晚期。有其特别的是, 巴扎盆地的上新世-更新世的河湖沉积中出土了大量的大小脊椎动物化石, 包括两栖动物、有鳞动物、食虫动物、啮齿动物和兔类。

The Georgian site of Dmanisi records the oldest evidence of human presence in Eurasia, close to 1.8 Ma. The small mammal association of this site is characterized by the presence of the gerbil *Parameriones* aff. *obeidiyensis* and *Mimomys pliocaenicus*. Apparently, there are not equivalent levels of the same age in the Guadix-Baza Basin. The closest site would be Barranco Conejos, provided its basal upper Matuyama position, as in the case of Dmanisi. However, the presence in the former level of *Tibericola vandermeuleni*, an eastern immigrant which is absent from Dmanisi, suggests a somewhat younger age with respect to the Georgian site. Even so, there is no any evidence of human presence at this time in this

part of Western Europe. This is also the case in the forthcoming level of Venta Micena, despite the more than 15.000 bones that have been recovered from this rich paleontological site.

However, the situation changes abruptly at the level of Barranco León D (sites of Barranco León D and Fuente Nueva 3), where thousands of Mode 1 lithic artefacts have been recovered in the last years. As we have seen, there is at this time a significant recovery in the climatic and environmental conditions, with high temperature and humidity levels. Since Barranco León-D and Fuente Nueva-3 can be dated around 1.4 Ma, it means that between the first human evidence at Dmanisi and the Orce sites there is a gap close to 400 kyrs, which in

the Guadix-Baza sequence corresponds to the levels of Barranco Conejos and Venta Micena. The abrupt appearance of early humans at the level of Barranco León D suggests that this event is most probably correlated with the amelioration of the climatic and environmental conditions which have been recorded at this time. The delay of close to 400 kyrs between the Southern Caucasus and the Iberian Peninsula can therefore be explained on the basis of the hard environmental conditions that predominated in the latter region during the first part of the early Pleistocene, as evidenced by the Guadix-Baza succession. The absence of hominids in Western Europe at such early times as Dmanisi was therefore a result of the different ecological conditions at the two ends of the Mediterranean, and not a consequence of physiographic barriers or poorly developed industry.

Once early humans established in the Guadix-Baza Basin, a continuity of the settlement is observed at the end of the Early Pleistocene (level of Huéscar 1) and during the Middle Pleistocene (sites of Cúllar Baza and Solana de Zamborino), probably similarly linked with favourable environmental conditions.

格鲁吉亚的德曼尼西遗址有人类出现在欧亚大陆的最早证据，接近 180 万年。其中代表性的小哺乳动物是欧贝蒂沙鼠 *Parameriones aff. obeidiyensis* 和上新獭鼠 *Mimomys pliocaenicus*。显然，在瓜-巴盆地不

存在年代上对应的地层。与德曼尼西年代最接近的遗址应该是兔子谷，在平顶火山位置的基部上层。但是在前一层中出现了范德牟田鼠 *Tibericola vandermeuleni*，这是在德曼尼西不存在的东方外来种，说明兔子谷比格鲁吉亚的遗址相对晚一些。即便如此，西欧的这个地方在当时也没有人类存在的任何证据。上层的迈锡尼遗址也是一样的情况，即便是在这个埋藏丰富的遗址中出土了一万五千多篇骨骼。

但是，从狮子谷 D 层(狮子谷 D 和新源头 3 遗址)开始，情况就突然改变了。在过去几年内这一层中发现了数千件第一模式的石器工具。正如我们所见，当时气候和环境条件发生了天翻地覆的改变，温度和湿度都很高。因为狮子谷 D 和新源头 3 的年代大约是 140 万年，所以在德曼尼西和奥茨遗址的最早人类证据之间有一个近 40 万年的断层，这个断层在瓜-巴盆地的序列中对应着兔子谷和迈锡尼遗址。狮子谷 D 层早期人类的突然出现，说明这一事件很有可能与我们所观察到的当时气候和环境条件的改善有关。南高加索与伊比利亚半岛之间近 40 万年的延迟，可以解释为早更新世的第一段时期伊比利亚环境条件恶劣，正如瓜-巴演替序列所示。所以西欧地区没有像德曼尼西那么古老的人类化石，应该是源于地中海两端的生态环境的不同，不是地形屏障或者技术落后的原因。

我们观察到，早期人类一旦到达瓜-巴盆地，就持续的定居了下来，贯穿整个早更新世(惠斯卡 1 层)和中更新世(库拉-巴扎和索拉纳-德-赞波瑞诺遗址)，这同样可能与宜人的环境条件有关。(李辉 译)