# PROGRAMME & ABSTRACTS

# INTERNATIONAL PALAEONTOLOGICAL CONGRESS

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## S17 - DENTAL FUNCTIONAL MORPHOLOGY OF HOOFED MAMMALS: INSIGHTS FROM 3-D MICROTEXTURE ANALYSIS

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Mammals inhabit all types of environments and evolved chewing systems capable of processing a huge variety of structurally diverse food components. Since the permanent dentition of mammals is not replaced or repaired in a natural setting, functional changes in surfaces induced by wear play a major role in the evolution of functionally durable teeth. Surface textures of cheek teeth should thus reflect the mechanisms of wear as well as functional traits. We employ industrial three-dimensional (3D) surface texture parameters after ISO/DIS 25178 and Scale-Sensitive Fractal Analysis to quantify dental wear in herbivorous ungulates at the level of a single wear enamel facet. 3D topographic models of the facets are acquired using a high resolution confocal surface measurement system. We evaluate cheek dentitions of two grazing ungulates, *Connochaetes taurinus* (Bovidae, Cetartiodactyla) and *Equus grevyi* (Equidae, Perissodactyla), and of two browsing ungulates, *Giraffa camelopardalis* (Giraffidae, Cetartiodactyla) and *Diceros bicornis* (Rhinocerotidae, Perissodactyla). These species inhabit a similar habitat in East Africa and represent two opposite diets and two fundamentally different digestive strategies within the two orders. We test the hypothesis that the four species show mesiodistal and bucco-lingual gradients within a tooth row that relate to their specific food composition. Industrial standards applied on the enamel surfaces distinguish subtle dietary preferences, even between grazers. Furthermore functional traits along the tooth rows are retrieved. We found that attrition-dominated peripheral ridges function as guidance structures in non-ruminants. Therefore surface textures are additionally interpreted as indicators of chewing mechanisms and occlusal function.