# Supplemental Document 1 for “Revisiting bone grease rendering in highly fragmented assemblages”

This document provides information for ten new morphological criteria identified in the present study (these are marked with an asterisk in the accompanying paper, see Table 3). These criteria are presented starting with the proximal humerus. ANE is the Actual Number of Elements. Due to severe fragmentation, MNE (Minimum Number of Elements) and NDE (Number of Distinct Elements) values were not calculated. Anatomical landmarks are described followed the nomenclature in Barone (1999).

**Humerus(ANE=6)**

Proximal and distal epiphysis: Humeral head (*Caput humeri*) and distal condyle (*Trochlea humeri*)

Many subconical fragments from humeral heads and condyles were observed (**M7-H**, NISP:56). These fragments show a slightly convex articular surface, which indicates that they derive either from the head or trochlear portion of the distal condyle.

The distal condyle also yielded several fragments corresponding to a portion of the ridge delimiting the lateral aspect of the *Trochlea humeri* (**M8-H**, NISP:4).

**Ulna (ANE=6)**

Proximal: Trochlear notch (*Incisura trochlearis*)

This bone region often yielded fragments corresponding to the medial articular surface for the radius. The same specimens generally comprise most of the accompanying ridge that links the articular surface to the shaft (**M4-U**, NISP:5). The dorsalmost portion of the trochlear notch (*Processus anconaeus*) was also frequently identified (**M5-U**, NISP:5).

**Metacarpal (ANE=6)**

Proximal epiphysis: Articular surfaces for the carpals

Most fragments correspond to subtriangular fragments showing a small, relatively flat portion of one of the proximal articular surfaces. The fragments are associated with a moderately elongated portion of the medial, anterior or lateral aspect of the proximal shaft (**M4-Mc**, NISP:17).

Metaphysis: Cones

In unfused metapodials, the distal portion of the shaft shows eight protuberances (“cones”) that are symmetrically organized. Fractures tend to occur between these protuberances creating subconical fragments (**M5-Mc**, NISP:16).

**Femur** **(ANE=6)**

Proximal epiphysis: Femoral head (*Caput ossis femoris*)

The fovea (*Fovea capitis*) of the head of the femur was sometimes split during bone comminution, probably because this zone is mechanically less resistant to impact (**M6-F**, NISP:3).

Proximal epiphysis: Femoral head (*Caput ossis femoris*) and medial/lateral condyles (*Condylus medialis*, *Condylus lateralis*)

Many subconical fragments from femoral heads and condyles (**M7-F**, NISP:60) were observed. These fragments show a slightly convex articular surface, which indicates that they derive either from the head or one of the medial or lateral condyles.

**Metatarsal (ANE=6)**

Because patterns for the metatarsal are nearly identical to those for the metacarpal, the same criteria are listed here.

Proximal epiphysis: Articular surfaces for the tarsals

Most fragments correspond to subtriangular fragments showing a small, relatively flat portion of one of the proximal articular surfaces. The fragments are associated with a moderately elongated portion of the medial, anterior or lateral aspect of the proximal shaft (**M4-Mt**, NISP:22).

Metaphysis: Cones

In unfused metapodials, the distal portion of the shaft shows eight protuberances (“cones”) that are symmetrically organized. Fractures tend to occur between these protuberances creating subconical fragments (**M5-Mt**, NISP:20).