SYNOPSIS OF THE PALEOLITHIC EAST ASIA (China, Korea, Japan)

Period	Sites	Tools/*Hominids*/ Symbolic Behavior	Fauna
'Oldowan' ('Lower' or 'Early Paleolithic')	General: pebble core-flake tools		
	Renzidong, Anhui, China (faunal) 2.0-2.5 MYA (Jin et al 2000) *(CR2000)* (ESR) 'underestimate' at [ave. EU =1.2 Ma and ave. LU = 1.7 Ma] *(CQ2003)*	59 artifacts, mostly on iron ore, single and double platform cores, scrapers, flakes and 3 bones (one rhino mandible) flaked to make tools *(SS2000, CR2000)* but most assert not hominid tools *(CR personal com. 2006)*	*EquusSinomastodon*, an ancient tapir, and monkey *Procynocephalus, Meganterion* (dagger-toothed cat) *(CR2000) rhino (SS2000)*
	Longgupo, Chongqing, China Levels 7, 8 hominid (paleomag. Olduvai Event) 1.78-1.96 Ma (supported by ESR on cervid tooth L4) *(HW1995)* and by ESR and U-Series on 4 animal teeth L2-5 *(CT2001)*	1 hammerstone, 1 flake; andesite-porphyrite not local, curated // Oldowan *(HW1995)*	*Ailuropoda microta,Equus yinnimiensis, Sinomastodon Gigantopithecus blacki Pachyycrocuta* or *Homotheriunm (HW1995)* Mandible and tooth, *Homo sp. indet.* // *H. habilis* or *ergaster (HW1995)* but (Wu 2000) not *homo* but *Lufengpithecus* ape (*ED1997, HM2002)*

	Yuanmou Basin, southwest China, (paleomag.) in reversed polarity above Olduvai 1.77 Ma and below Jaramillo normal 1.07 Ma and (sedimentation rate) yields 1.70 to 1.71 Ma, or given variable sedimentation, **~1.7 Ma**, slightly later than Dmanisi (1.75-1.77 Ma), roughly contemporaneous with Nihewan sites, Majuangou (1.66) and Java (1.5-1.8 Ma) and NE Asia *(ZR2008)* (paleomag.) Gilsa 1.7 Ma (ESR on associated animal teeth) 670-1,670 ka *(HP1998)* (paleomag.) just above M-B Boundary 780-790 ka or ca. 700 ka *(HM2002*) but sample 600 m north of site *(ZR2008)*	4 in situ artifacts in strata with hominin remains; made on small quartz cobbles, overlapping flake scars, plaform and flake scar indicative of stone-on-stone percussion; 1 small bifacial core, 1 unifacial scraper (with overlapping flake scars), 2 flakes – all quite similar to African Oldowan made of quartz or quartzite *(ZR2008)*	Site: *Nestoritherium, Cervocerus, Procapreolus stenosis, Equus yunnanensis, Rusa sp.; Axis sp., Bos sp., Gazella sp., Cervus sp., Bovidae, Sus, Stegodon sp., Rhinoceros sp., Hystrix*, etc. Molluscs indicate lakeshore or marsh setting; pollen, forest patches of *Pinus*, *Alnus* and herbaceous vegetation Member 4 of Yuanmou Sequence: Early Pleistocene: above plus *Stegodon elephantoides, Hyaena licenti, Megantereon nihowanensis, Panthera tigris, Rhinocerus sinensis, etc. (ZR2003)* 2 incisors, *Homo erectus* but questions of association *(BP2006*) 'early Homo sp.', nearly identical in features to Zhoukoudian (specimen PA66) and African erectus (KNM-WT 15000) and also KNM-ER 1590B attributed to *Homo habilis;* suggesting *Homo* once dispersed from Africa spread rapidly across Asia during earliest Pleistocene, consistent with a southern route into East Asia *(ZR2008)*

	Majuangou, Nihewan Basin, no. China Lower: (paleomag.) 4 artefact layers from (MJG-III) ~ **1.66 Ma** Upper (Banshan) **~1.32 Ma** correlates with Xiaochangliang *(ZR2004)*	Percussion marks on animal bones for marrow extraction; hard hammer, cores (choppers, scrapers, polyhedrons), flakes, flake tools: scrapers, notches *(ZR2004)*	Mostly *Elaphus sp*. at MJG-III, *Equus sanmeniensis, Coelodonta antiquitatis, Pachycrocuta sp. (hyena), Cervus sp. Gazella sp., Struthio sp. (ZR2004)*
	Xiaochangliang, Nihewan Basin, northern China (paleomag. between Olduvai and Jaramillo) **~1.36 Ma** *(ZR2001)*	Flint, quartz, volcanic rock, quartz, 86% flake scrapers, including side scrapers, notches, a few end scrapers, burins, disc cores (*ZR2001*)	*Palaeoloxodon sp, Hipparion sp, Equus sanmeniensis, Coelodtona antiquitatis, Cervus sp. Gazella sp, Hyaena licenti (ZR2001)*
	Xihoudu, Ruicheng, Shanxi, China (paleomag.) **1.27 Ma** *(ZR2003)*	32 quartzite, gangue, lava implements, choppers, scrapers, points *(WQ2000)*	Early Pleistocene fauna: *Trogontherium, Stegodon, Archidiskodon planifrons, Hipparion sinense, Coelodtona antiquitatis, Hyanea sp., Gazella, Bison palaeosinensis, Equus sanmeniensus, Sus (WQ2000)*

Early Acheulian	EA General: core tools, including handaxe, chopper, polyhedron, spheroid; low number of cleavers and flake tools; hard hammer; absent Levallois (Misra 1987)		
	Gongwangling, Lantian, China (palaeomag.) 1.15 Ma depending how sequence is interpreted (An et al., 1990; An and Ho, 1989; Wu et al., 1989) *(BP2006)* but 1.2 Ma (Hyodo et al 2002)	cores (11), five flakes and four scrapers (Dai, 1966; Tai and Hsu, 1973) *(BP2006);* calotte, *Homo erectus;* quartzite, quartz, sandstone *(LJ1998)* 'early Acheulian biface'	
	Donggutuo, Nihewan Basin, no. China (paleomag.) 1.1 Ma *(WH2005)* but if variable sedimentation rate: 1.0963-1.1329 Ma, 1.1090-1.1733 Ma, or 1.1285-1.2098 Ma *(WQ2006)*	Chert, etc.; flakes and flake tools: side scrapers, end scrapers, notches, points, awls, burins, hammer percussion, some bipolar (*WH2005)*	*Canis sp., Palaeoloxodon sp. Equus sanmeniensis, Coelodonta antiquitatis, Bison sp. Gazella sp. (WH2005)* During three stages of forest-grass steppe ecosystems on variable lake margin *(PS2009)*

Middle Acheulian	MA General: bifaces (handaxes, cleavers, trihedral picks); scrapers; Levallois; and non-Lev. Flake and flake tools; and pebble chopping tools; few polyhedrons and spheroids; hard hammer		
	Bose, China (AR/AR associated tektites) 803±3 ka *(HY2000)*	Bifaces (handaxe, pick) on flakes and cobbles fits all Mode II criteria; scar counts // MA Olorgesailie and Olduvai Gorge Beds III-IV *(HY2000)*; also quartz flakes *(LJ1998)*	
	Zhoukoudian Cave, China Locality 1, Layers 5-10 26Al/10Be burial dating of quartz and (4 quartzite artefacts L8/9) mean 0.72±0.13 Ma and (4 quartz from sediment L7, 8/9, 10) mean 0.81±0.11 Ma and mean for best 6 samples for L7-10, **0.77±0.08** Ma *(SG2009)* min. 600 and possibly >800 ka *(SG2001)* or 600-800 ka *(BN2004)*	Upper 8 = Quartz Horizon 2: quartz tools and flakes; ~20 quartz crystals, 1 perfect fully faceted, probably from 7 km away (Pei 1931) and spheroids *(BL1985; BR1991)*; tools and unworked non-indigenous stone Layers 9, 10 occasional quartzite tools: choppers, scrapers, some bipolar flakes *(BL1985)* associated with non-indigenously burned bones *(WSXQ1998)*.Evidence of stone cracking bones for marrow *(BL1985);* hominid cutmarks on horse, and less of *Bubalus* and cervid bones *(BL1986)*.	Layer 5: *Hyaena*, etc. Layer 7: *Sus, Bubalus*, Sitka deer, etc. Layer 8: two types rhino, giant horse, elephants, flat-antlered deer, hyena; Layer 10: Hyena, horse *(BL1985)* Equids are from Loci N and O = Layers 8, 9 and 10 and contra *BL* are associated with hominid remains *(Aigner, Comment in BL1986)* *Pachycrocuta brevirostris,* largest extinct hyaena, and erectus bones show hyaena damage *(BN2002)* Layer 7: *Homo erectus*; Layer 8, 9, 10: *Homo erectus*

'Later Acheulian' (Africa: 300-650 ka)	General (Africa defined): Bifaces more symmetrical and refined, cordiform, amygdaloid, ovate handaxes; some assemblages ovate dominates; greater use of soft hammer; increase use of Levallois technique, but some sites no Levallois; disappearance of core-choppers; often length of handaxes decreases; denticulates, notches, scrapers continue; few blades late contemporaneous with Final Acheulian		
	Tangshan Cave, Nanjing, China (Useries speleothem deposit overlying fossils) >580 and probably ~**620 ka** *(ZJ2001)*		fragment cranium, *Homo erectus*, N1 shares typical traits of African and European *erectus*, but differences from Zhoukoudian suggest regional variations *(LW2004)*
	Yunxian, Hubei, China (ESR on mammal tooth) 455±58 to 800±164, mean **581±93 ka** *(CT1996)*	Majority of tools are pebble tools, small flake tools rare; handaxes, cleavers, choppers, chopping-tools, picks, scrapers // Lantian and Bose *(FX2008)*	*Homo erectus* with features of *Homo sapiens archaicus (TL1992)*
	Chenjiayao, Lantian, Shaanxi China (palaeomag.) ~500-650 ka (Wu et al. 1989; An et al. 1990) *(PB2)*		Mandible, probably female *Homo erectus (PB2)*
	Zhoukoudian Cave, Locality 1, China Layers 2-4, (TIMS U-series) **400-500 ka** *(SG2001)(BN2004) (GR1997)* (ESR on associated teeth) 300-550 ka	2 skulls, 1 tooth *Homo erectus;* Cores, flakes, retouched hammers, scrapers, points burins, chopper (Chiu et al 1966*) (BL1985)* Quartz, greenstone, chert: pebble choppers; cleavers, modified flakes mostly **points** and scrapers; block on block technique early and later more bipolar technique with improved retouching *(LJ1998)* hominid roasting of horseheads *(BL1986)*. Artifacts associated with non-indigenously burned bones *(WSXQ1998)*	*Hyaena sinensis, Crocuta ultima, Felis tigris, Ursus arctos, Canis lupus, Cervus grayi, Megaceros pachyosteus, Cervus elaphus, Gazella sp., bovidae, Sus l., Equus sp. Dicerorhinus mercki, Macaca robustus* (Chiu et al 1966) *(BL1985)*
	Kommonmoru, North Korea (geobiostratig.) 400-600 ka *(BK1992)*	Pick, handaxe-like, core scrapers on limestone; modified (?) quartz cobbles with animal bone *(BK1992)*	*Equus sangwontensis, Megaloceros, Macaca, Dicerorhinus, Bubalus* // Zhoukoudian Loc. 1. *(BK1992)*

	Chongokni, Imjin-Hantan Basin, South Korea Layer XI basalt bedrock = (K/AR + fission track) 400±100 ka; 290±30 ka *(BK1992)* or ~500 ka *(NC2006)* Layer IX lowest tools with handaxes (est. if steady sedimentation rate) = **300-350 ka** Layer IV tephra = (K-Tz) 90-95 ka Layer II tephra = (AT) 22-25 ka *(NC2006)*	Open air site, 5000 quartz, quartzite mostly cores choppers, polyhedrals, small flake tools: scrapers and **points** and, 'heavy duty' tools (< or =5%) Acheulian-like handaxes, cleavers, picks *(BK)* by hard hammer mostly on cobbles, 'primarily Mode 1 toolkits' and overall bifaces 'thicker', smaller % of toolkit, and lower proportion of sites *(NC2006, NC2000)*	
	Longyadong Cave, Nanhua River, South Luohe River, Luonan Basin, Shaanxi, China Layer 5 (TL) 210.5±10.5 Upper Layer 4 (TL) 273.9±13.7 ka Middle Layer 4 (TL) 356.6±17.8 ka *(WS2005*) Layer 2 (geostratigraphy) ~500 ka; hence sequence range **250-500 ka** Layer 4 // Zhoukoudian Layer 3-5 Layer 3 // Zhoukoudian Layer 8-9, and Layer 2 // Zhoukoudian Layer 10 *(WS2005*)	Layer 4: 'living floors', ash (hearth?), artifacts, fossils; Layer 3: artifacts, charcoal, animal fossils; Layer 2: artifacts, fossils. Strong evidence for fire: 70 cm ash localized, with burnt bones, artifacts and rocks; fractured and cutmarked bones, esp. *Cervus sp*., 75% burnt bones, 100% cutmarks, and largest MNI *(WS2005*)	Middle and late Middle Pleistoscene *Ailuropoda-Stegodon* fauna: *Macaca; Hystrix* (porcupine); *Trogontherium; Arctonyx* (badger); *Megatapirus*; *Rhinoceros sinensis; Ursus sp*.; *Sus sp.* (pig); *Cervus sp*. (deer); *Bison sp. (WS2005)*
	Longtandong Cave, Hexian, China (ESR and U-Series on associated teeth) 412±25 ka = OIS 12-11 *(GR1998)* (Useries) 150-190 ka; (TL) 195±16 (Wu et al. 1989) *(BP2006)*		Late *Homo erectus,* more advanced than at Zhoukoudian Loc. 1 though similar time (GR1998)

	Kumpari, Imjin-Hantan Basin, South Korea (OSL, IRSL) 30-270 *(NC2000)* but may actually // Chongokni *(NC2006)*	Open air site, 3000 quartzite and quart tools, similar to Chongokni *(NC2006, NC2000)*	
	Chuwoli and Kawoli, Imjin-Hantan Basin, South Korea (OSL, IRSL) 30-270 *(NC2000)* but may actually // Chongokni *(NC2006)*	Open air site, 600 artifacts, mostly flakes and debitage, some handaxes, cleavers, picks, similar to Chongokni *(NC2006, NC2000)*	
	Kumgul, South Korea Layer VIII 600-700 ka (Sohn 1987) but fauna suggests Late Middle Pleistocene *(BK1992*) [= 128-300 ka]	Stone industries: Layer VIII: choppers, bifaces, unifaces, polyhedrals; VII: limited retouch, unifacial choppers and unifaces: IV, extensive retouch, bifaces	

Final Acheulian (Africa ~150-300 ka)	General (Africa defined): multiple reduction strategies, Acheulian bifaces, sometimes made on Levallois flakes, Levallois and disc cores; variable presence of handaxes, cleavers as well as points, blades; in Africa termed 'Final Acheulian' or 'Intermediate' with regional variants *(CJ1965)*; blades in African Kapthurin and Fauresmith and Levantine Mugharan Tradition *(AS2002)*		
	Luonan Basin, China 268 open air sites *(WS1998)* Zhoupo Second Terrace L15 (TL) **182.8±9.1 ka** Second Terrace L12 (TL) **251.05±12.5 ka** *(WS2005*)	In 50 open-air sites: quartzite, quartz; direct hard hammer, single and double platform cores, 5% discoid, bipolar rare; flakes, retouched tools: scrapers, pick (including trihedral), cleaver, handaxe and chopper, spheroid; **few points**, and burins; Longya Cave: similar cores and flakes as open-air sites, more 'anvil-chipping' technique, but tools: scrapers, **points**, burins only;' this dichotomy is not explained by any current theory of hominid behavior' *(WS1998, WS2006)*	(see above) Contra Norton el. (2006)S some metrical overlaps between handaxes and cleavers in the West and East, suggests possible convergence in lithic assemblage formation, but also possibility that handaxes and cleavers in the Luonan Basin (China) may represent evidence for Acheulean stone tool manufacturing methods *(PM2008)*

	Dingcun sites, Fen River Valley, Shanxi, China (Useries, ESR, litho- and biostratigraphy) **75-210 ka** with most chronometric dates at Middle-Late Pleistocene transition *(NC2006)*	Over 2000 implements by direct and bipolar percussion: cores, flakes, choppers, scrapers, heavy trihedral 'point tools' or picks // Sangoan, spheroids, protobifaces, rare cleavers, retouch like EA *(CJ1994; NC2006)*	3 teeth and partial parietal at Locality 54:100 *Homo sapiens archaic (NC2006)*
	Chaoxian, Yinshan, Anhui, eastern China Locus A: Locus B: Hominin level: TIMS (speleothems) min. 191±2 ka, best estimate **310-360 ka or older** (SG2010); Th/U and Pa/U 4 (9 fossil teeth and bones) condordant dates: 160-200 ka (Chen et al. 1987) and ESR (deer tooth) LU 212±30 ka (Liang et al. 1995); TH/U 3xalpha (capping flowstone) 310+45-32 ka as min. age; (4 calcite, 3 fossil, 1 phosphate sample, gave similar age (Shen et al. 1994) *(SG2010)*	No artifacts	Locus A: Early Pleistocene fauna: *Hyaena brevirostris licenti; Megantereon sp., Tetralophodon sp.; Proboscidipparioin sp*., etc. Locus B: Middle Pleistocene fauna: *Hyaena brevirostris sinensis; Stegodon; Sus xiaozhu; Megaloceros pachyostus*, etc. Locus B, L1-4: occipital, maxilla, *archaic Homo sapiens (BS2010)*

Early Middle Paleolithic (~150-250 ka)	General (African /Southwest Asia definition): elongated or large, relatively thick, blades and point blanks flaked from radial, single or opposed platform cores, recurrent and some or no Levallois, with minimal preparation of striking platform; elongated blanks, retouched points, prismatic blades, endscrapers, burins; no backed microliths; evidence of hafting points and blades (tangs, grooves, mastic); use of color pigments; *archaic Homo sapiens*		
	Zhoukoudian, China Locality 4 = New Cave (Useries capping flowstone) 120 ka; (second flowstone, possibly min. age hominid) **248-269 ka** (lowest cultural strata) ca. 300 ka *(SG2003)*	Tools	teeth *Homo archaic*; ash, seeds, mammal bones
	Zhoukoudian, China Locality 15 (10 m. from Locality 4) age comparable to Loc. 4	Direct percussion, multi-directional and alternating flaking, disc cores, flakes, no Levallois points, 1 'accidental' flake point *(GX2000)*	33 species, deer, Gray's sika, rhino, sheep
	Jinniushan, Liaoning, China Layer 7: (ESR on associated animal teeth) (EU) 187 ka, (LU) 281 ka (Useries mean) 237 ka 'suggests an age of about **200 kyr or older**" *(CT1994)*; but ~ 260 ka based on (CT1994) *(RK2006)* is misread?		*Macaca robustus, Trogontherium sp. Megaloceros pachyossteus, Dicerorhinus mercki (CT1994)* Female, mean of estimates 1330 cc and body size/EQ typical of world hominids ca. 200-300 ka *(RK2006); archaic Homo sapiens,* similar to Dali *(CT1994,* BP2006)
	Dali, Shaanxi, China (Useries on ox teeth) **209±23 ka** (Chen et al 1994) (but association uncertain *BP2006)*	Cores, flakes, scrapers (Wu 1981, 1989) *(KS1996) (BP2006)*	*Homo sapiens archaicus*

Middle MP (~100-150 ka)	(if dates correct) *H. sapiens sapiens* overlaps with *archaic Homo sapiens*		
	Bailiandong Cave, China (U-series on capping flowstone) **~160 ka** (Shen 2001) *(SG2002)*		2 teeth, *H. sapiens sapiens*
	Xinglongdong Cave, Three Gorges, south China L2: U-series (Stegodon molar) IGG lab (5x): range 110-130 ka NNU lab (1x): 154±9 ka and biostratig. **120-150 ka** *(GX2004)*	L2: 20 lithic artifacts: hardhammer; mostly unifacial 'typical of south China pebble industry'; 1 core, 1 flake, 1 point, 4 scrapers, 13 chopper-chopping tools, and debris; 2 *Stegodon* tusks of 2 individuals layed parallel to each other, engraved straight and curved lines on tusk, in groups, simple and abstract images *(GX2004)*	Rich mammalian bones and teeth: *Homotherium sp., Panthera sp., Stegodon orientalis, Ursus, Ailuropoda, Nyctereutes, Megatapirus, Dicerorhinus, Sus, Cervus, Megalovis, Capricornis, Bibos,* etc. Tooth, old age individual, tooth smaller than *erectus*, in range of *Homo sapiens*
	Maba, Guandong, China (Useries) **129-139 ka** (Yuan et al., 1986) *(SG2002)*		*Homo sapiens archaicus* - associated with *Ailuropoda-Stegodon (BP1992)*
	Xujiayao, Shanxi, China (Useries on rhino teeth) **104-125 ka** (Chen et al., 1984; Chen et al., 1982) *(SG2002)* (but association questions *BP2006*)	Large tools rare, scrapers common, bone and antler tools (Jia et al 1979; Wu et al 1989) *(BP2006)* percussion, tooth and cutmarked equid bones show hominins had primary access to high utility meat-bearing and marrow rich long bones without pressure from competing carnivores *(NC2008x)*	Fauna dominated by equid remains *(NC2008x)* *Homo sapiens archaicus* (Wu and Poirier 1995) *(BP2006)*

	Huanglong Cave, Yunxi, Hubei, China L3: 3 labs tested: TIMS (speleothem) range 103.7-103±1.6 ka; U-series (2 rhino teeth near hominin locus) 79.4±6.3 and 94.7±12.5; ESR (rhino tooth) 34.8 to 44.2±3-5 ka thus **34-100 ka** *(LW2010,* likely **100 ka** *(WX2006)*	L3: 36 artifacts, mostly quartz, sandstone, flint, quartzite; direct hard hammer and bipolar techniques; bipolar cores, hammers, flakes, waste flakes, fragments, 14 retouched – scrapers, picks, chopping tools, burin, awl; bone tools – 3 bone points, 2 bone scrapers, 1 unifacial 'spade'; plant charcoal evidence for fire; bones with cut and percussion marks as at Zhoukoudian Upper Cave *(LW2010)*	Late Pleistocene *Ailuropoda-Stegodon* fauna; rhinoceros *(WX2006)* 7 teeth, *H. sapiens sapiens (LW2010; WX2006)*

Late MP (< ~100 ka)	General: more blade based tools; flake blades and blade cores; retouched blades, and/or points, and scrapers; *Homo sapiens sapiens*, with overlap *archaic sapiens*)		
	Tongtianyan Cave, Guangxi, south China, (Useries on flowstone) 61±1 to 68±1 'more likely ~111-139 ka or if from clay level ~153 ka *(SG2002)*	Liujiang hominid, *H. sapiens sapiens*, but exact depth ambiguous *(SG2002)*	*Ailuropoda melanoleuca, Rhinoceros sinensis, Stegodon orientalis, Pongo sp., Sus sp., Megatapirus* augustus but this is overlying unit? *(SG2002)*
	Ganquian Caves, China (U-series on capping flowstone) **~94 ka** (Shen 2001) *(SG2002)*		17 teeth, *H. sapiens sapiens* with *Ailuropoda-Stegodon* fauna *(SG2002)*
	Lingjing, Xuchang, Henan, China (fauna) Xujiayao type fauna, **ca. 100 ka** (preliminary OSL by Zhou Liping) 80-100 ka or earlier *(ZS2009)*	10k artifacts, MP stone and bone tools; burned animal bones *(ZS2009)*	10k animal fossils, 18 species, predominant *Bos primigenius, Equus caballus, Megaloceros;* MNI statistics similar to La Borde, France MP, except here more focus on prime age than juvenile; 20 fragments, skull fragments, parietal, occipital, mastoid, etc. *(ZS2009) H. sapiens sapiens* (news story)
	Mulan Mountain, cave, Chongzuo, Guangxi Unit B L1 (Th/U-series 100.0±14.1 ka L2 (hominin layer) **110.5±6.4 ka** which is consistent with fauna *(JC2009)*		Fauna characterized by *Elephas kiangnanensis* and *Elaphis maximus*; hominin, 2 teeth, 1 mandible, '*early' Homo sapiens*, with primitive non-modern features *(JC2009)*
	Jingshuiwan, Changjiang River, Three Gorges, China 2nd Terrace, L7: OSL **~70 ka** *(PS2010)*	Transitional Pebble Tool Tradition, large pebble tools but majority small flake tools L7: silicarenite, etc.; direct hammer percussion without prepared striking platforms; uni- and multidirectional cores, flakes, fragments, stone hammers, chunks, 118 retouched tools (predominantly chopper-chopping tools and scrapers, with points, notches) *(PS2010)*	Tool industry may be indirect evidence for late *Homo erectus [actually, archaic H. s. since PS compares to Neanderthals in Europe]* in MIS4 *(PS2010)*

	Tianyuan Cave (near Zhoukoudian) L3 AMS (hominin femur) **34,430±510 ka** (**cal. 40,328±816** ka) (nonhuman bones) range 30 to 40 ka or cal. 35.3 to 44.2 ka (Shang et al. 2007) *(PS2010)*	Stable isotope dietary analysis of human and associated faunal remains indicates substantial portion of diet was freshwater fish *(HY2009)*	L3, femur, *Homo sapiens sapiens* (earliest directly dated unambiguous evidence for *H.s.s.*) *(PS2010)* Morphological comparison indicates it has several late archaic features implying a simple spread of modern humans from Africa is unlikely *(SH2007)*
	Gaitou Cave, Laibin, Guangxi, south China Th/U (capping flowstone) **38.5±1.0** and (calcite vein beneath hominid remains) **44.0±0.8 ka** and second flowstone layer below cultural sequence) **112.0±1.4 ka** *(SG2007)*		Teeth, cranium *Homo sapiens sapiens* (SG2007)

	Ryonggok Cave, North Korea (Useries) **46-48 ka** *(NC2000)* (TL) 500 ka *(BK1992)*		5 *Homo sapiens archaic* (Jun et al 1986) *(NC2000)*; but 1450 to 1650cc so not *H. erectus* as thought *(BK1992)*; [but 1550cc is comparable to Skhul-Qafzeh and modern *H. sapiens sapiens* – JBH]
	Myoungo-ri, Nam Han River, South Korea (est.) ~40-50 ka (Choi 1986) *(BK1992)*	'Late MP', slate, quartz, some quartzite, bifaces, choppers, picks, scrapers, points, denticulates, knives, notches *(BK1992)*	
	Hongsu Cave, South Korea ~40 ka *(NC2000)*	child, *H. sapiens sapiens* *(NC2000)*	Upper Pleistocene fauna *(NC2000)* [post 128 ka]
	Pyeongchang-ri and Upper Juwol-ri, Imjin-Hantan River Basin, South Korea (geo.) overlies AT tephra dated 29.4±1.9 ka, so **OIS3** *(SC2004)* OIS3 = >**32** but **<64 ka**	'Non-UP' [= Late MP] industries persist contemporaneous with UP. Choppers, handaxes, picks, notches on quartzite cobbles; quartz flaked for denticulates, backed knives, trapezoids, 'pseudo-prismatic cores'; scrapers, points and awls on either quartzite or quartz *(SC*2004)	

Upper Paleolithic	General: retouched points, blades, bladelets, small and microlithic tools; bone tools, soft hammer, more art; in Japan, grindstones by 30 ka		
	Shiyu, Huairen, Shanxi, China Lower Occupation (14C) **32.220±0.625 ka** Upper Occupation (14C) **28.135±0.37 ka** *(BR1991)*	Upper: 30k; Lower: 40k stone artifacts, combine MP and UP features; perforated stone disc; 600 bone fragments with marks which appear not to be intentional *(BR1991; BR1994)*	
Middle UP	Shuidonggou, Biangou River near Yellow River, border Mongola, NW China Terrace 2 SDG-1 full stratig. (OSL) Lower: Late Pleistocene L6 bottom: **35.7±1.6 ka** L6 middle: **34.8±1.5** ka L5 bottom:**17.7±0.9 ka** L5 middle: **15.8±1.1**ka L4 bottom: **32.8±3.0 ka** L4 top: **29.3±4.1 ka** L3 top: **28.7±6.0 ka,** UP Upper: Holocene L2 top: 9.1 ka L1 top: 4.2 ka, Neolithic *(LD2009)*	SDG-1, L6-7 and 8b: EUP, quartzite, silicified limestone; Levallois-like cores, point, flake, and uni- and bidirectional blade cores; 2 pyramidal bladelet cores; majority of blades Levallois; subprismatic rare; in general, "with a strong MP typological signature" *(BP2001)* SDG-1, L3-5 *[apparently a renumbering of strata from 2001]*: UP *(LD2009)*	(Licent & Chardin 1923; Jia, Gai & Li 1964; Ninxia Museum 1987; Geng & Dan 1992) *(BP2001)*
	Terrace 2 SDG-2 L17 lower to upper: OSL 72.0±4.9; 64.6±3.6;19.6±2.5 L16 lower: AMS (twig) **36.27±0.22 ka** L16 upper: OSL **38.3±3.5** or AMS (peat) **29.7±0.25 ka** *(LD2009)* SDG-7 L10 middle: OSL **27.2±1.5** L8 middle: OSL 25.2±1.8 ka *(LD2009)*	SDG-2, L16: UP *(LD2009)* SDG-7, L8, L10: UP *(LD2009)*	

Late UP	Zhoukoudian, China Upper Cave 101, 102, 103 (AMS on non-human bone range from 13.2±0.16 to 33.2±2 ka (Hedges 1988; Chen 1989) (*BP1992*) (Wu and Wang 1985) argue older dates are well below areas of human occupation, which they place at around 10 ka, while (Chen et al. 1989; Hedges et al. 1992; Hedges et al. 1988) suggest ~**24-29 ka** for the cultural layers *(BP2006)* (14C on non-human bone) 10.175±0.360 (upper part of cave) and 18.31±0.11 (basal layers) (Wu & Zhang 1985) *(BP2006)*	UP tools, mostly chert, quartzite flakes, some scrapers, knives; 1 bone needle, polished antler; hematite lumps; ochre in burials, 1 elderly burial with perforated shell and fox canine; total 141 ornaments, some with traces of red ochre (125 perforated deer, fox teeth, 3 perforated shells, 1 perforated ovoid pebble, 1 perforated fish supra-orbital, 7 perforated stone beads, 4 tubular bone sections with // cut marks); typical of UP Europe and Siberia *(BR1991; (UNESCO Peking Man website)*	47 species of mammals, and fish, amphibians *(UNESCO Peking Man website);* cervid hunting *(NCz2006)* in natural trap of Lower Recess, processed cervids on site *(NC2008)* ~10 MNI *H. sapiens sapiens*; UC101 has affinities to Easter Island and European groups; UC103 tenuously similar to Australo-Melanesian groups*(CD2003;WJ1982)* 3-D morphometric analysis shows UC101 and 103 resemble UP Europeans, possibly share common ancestor, in accord with Single Origin model *(HK2009)* Question of association of fauna dates to hominids, evidence of strata disturbance *(BP1992)*
	Xiaonanhai, Anyang, Henan, China L6: 14C (charcoal) **24,100±500 ka** (Jia & Huang 1985) *(CC2010)*	944 artifacts (An 1965 and notebooks): chert; hardhammer and bipolar; 117 tools = scrapers (mostly bilateral scrapers, notches, denticulates), 82%, points 14.5%, choppers 3.4%; use-wear analysis on 32: 44% scraping, 13% cutting, 9% slicing, 3% carving, 31% uncertain; simple retouch and tools, contemporaneous with microblade sites, may be due to tropical/subtropical forest environment at site time *(CC2010)*	

	Hinatabayashi B, Nagano, Japan **30 ka** *(Tokyo National Museum online)*	UP tools, earliest ground and polished stone tools in world *(Tokyo National Museum online)*	
	Sokchang-ni, Kum River, South Korea Layer I.12 (14C charcoal) 30.69±3 ka (below cultural layer), **20.83±1.88 ka** *(BK1992)*	Layer 12: blade cores, end scrapers on blades, side scrapers, burins, becs, points; microcores // Aurignacian *(BK1992)*	
	Mandal-ni, Sangmaryong River, Hwachon, North Korea (fauna) 20 ka *(BK1992)*	UP: 7 microblade cores (6 obsidian, 1 quartzite); bone tools, mostly points; *H. sapiens sapiens (BK1992)*	Upper Pleistocene fauna [post 128 ka], esp. cervids *(BK1992)*
	Minatogawa, **Okinawa** (Suzuki and Hanihara 1982) (14C on charcoal) **16.6±0.3 to 18.25±0.65 ka** (Kobayashi et al. 1974) *(BP2006)*	3 skeletons = *H. sapiens sapiens* (Suzuki and Hanihara 1982; Suzuki 1982; Baba and Nerasaki 1991) *(BP2006)*	
	Suyanggae, Nam Han River, South Korea 5 layers IV: (14C) **16.4 to 18 ka** *(LY2000)*	'Early UP': shale, porphyry, quartzite; Layer 5b: end- and sidescrapers on blades (Lee Y 1984, 1985, 1992) *(BK1992)*; Layer IV: tanged points, microblades *(LY2000)*	
	Longgu Cave, Xinglong, Hebei, China (AMS on object) **13.065±0.27 ka** with matching 14C dates *(BR1991)*	*Cervus elaphas* antler engraved with multiple // and wavy lines, figure 8 motif, and zigzag, oblique crosshatch and horizontal // lines; noniconic art = in sophistication to Siberia, Russia, Europe *(BR1991; BR1994)*	*Cervus elaphus*

Paleolithic-Neolithic Transition **'Incipient Jomon'** 10-13 ka	General: earliest pottery 13 ka; marine resource exploitation 6 ka; millet agriculture 4 ka		
	Fukui Cave, Japan **12.5±0.35 & 12.5±0.5 ka** (Kamaki&Serizawa 1967) *(Wikipedia)*		
	Kamikuroiwa Cave, Ehime, Japan Layer 9 (14C) **12.165±0.35 ka** (Esaka et al 1967; Aikens & Higuchi 1982) *(BR2003; Wikipedia)*	UP tools, bifacial foliate points, shouldered arrowheads, pressed 'ridge pattern' earthenware; grooved whetstone or grindstone, engraved natural cylindrical pebbles, ~ 4 cm in length, possibly depicting 'breasts, skirts, long hair' (Aikens & Higuchi 1982) *(BR2003)*	
	Shuidonggou, Biangou River near Yellow River, border Mongola, NW China SDG-12, Holocene, **OSL 12.1±1 ka** *(WC2009)*	Locality 12, surface collected, 'possibly from uppermost strata' earlier than dated OSL 12.1±1 ka, along with microblade cores and microblades, bipolar cors, polished stone toosl, and pottery shards, 109 fragments of ostrich eggshell, including 54 perforated beads *(WC2009)*	

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