

[JJ] Evening Poster | S (Solid Earth Sciences) | S-GL Geology

## [S-GL32] Lower-Middle Pleistocene Boundary GSSP in the Kazusa Group

convener: Makoto Okada (Department of Earth Sciences, Faculty of Science, Ibaraki University), Yusuke Suganuma (National Institute of Polar Research), Koji Kameo (千葉大学理学研究科地球科学, 共同), Yoshimi Kubota (National Museum of Nature and Science)

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In the Chiba Composite Section, a candidate for the Lower-Middle Pleistocene GSSP which is currently under review, a lot of stratigraphic studies using paleomagnetism, marine microfossils, tephra layers and isotopes have been conducted intensively to propose GSSP. The aim of this session is to summarize and discuss scientific results from those studies including stratigraphic, chronologic and sedimentologic researches focusing on the Chiba Composite Section and/or some other contemporary sedimentary sequences.

## [SGL32-P02] Tephrostratigraphy of the Kokumoto Formation, Kazusa Group in the Yoro river route

\*Hiroomi Nakazato<sup>1</sup>, Yasufumi Satoguchi<sup>2</sup>, Yoshihiro Takeshita<sup>3</sup>, Makoto Okada<sup>4</sup> (1. National Agriculture and Food Research Organization, 2. Lake Biwa Museum, 3. Institute of Education, Shinshu University, 4. Department of Earth Sciences, Ibaraki University)

Keywords: marker tephra, Kokumoto Formation, M-B boundary

Because the M-B boundary is intercalated in the Kokumoto Formation, the Yoro river route is important as the type section of the formation. The marker tephras of the Kokumoto Formation that are the indices of the horizon in the type route, has been described in the Yoro river and the circumference are as follows, Ku0.1, Ku1, Ku2A, Ku2B, Ku2C, Ku2D, Ku2E, Ku2F, Ku2G, Ku2H, Ku2I, Ku2J, Ku2K, Ku2L, Ku2M, Ku2N, Ku2O, Ku2P, Ku2Q, Ku2R, Ku2S, Ku2T, Ku2U, Ku2V, Ku2W, Ku2X, Ku2Y, Ku2Z, Ku2AA, Ku2AB, Ku2AC, Ku2AD, Ku2AE, Ku2AF, Ku2AG, Ku2AH, Ku2AI, Ku2AJ, Ku2AK, Ku2AL, Ku2AM, Ku2AN, Ku2AO, Ku2AP, Ku2AQ, Ku2AR, Ku2AS, Ku2AT, Ku2AU, Ku2AV, Ku2AW, Ku2AX, Ku2AY, Ku2AZ, Ku2BA, Ku2BB, Ku2BC, Ku2BD, Ku2BE, Ku2BF, Ku2BG, Ku2BH, Ku2BI, Ku2BJ, Ku2BK, Ku2BL, Ku2BM, Ku2BN, Ku2BO, Ku2BP, Ku2BQ, Ku2BR, Ku2BS, Ku2BT, Ku2BU, Ku2BV, Ku2BW, Ku2BX, Ku2BY, Ku2BZ, Ku2CA, Ku2CB, Ku2CC, Ku2CD, Ku2CE, Ku2CF, Ku2CG, Ku2CH, Ku2CI, Ku2CJ, Ku2CK, Ku2CL, Ku2CM, Ku2CN, Ku2CO, Ku2CP, Ku2CQ, Ku2CR, Ku2CS, Ku2CT, Ku2CU, Ku2CV, Ku2CW, Ku2CX, Ku2CY, Ku2CZ, Ku2DA, Ku2DB, Ku2DC, Ku2DD, Ku2DE, Ku2DF, Ku2DG, Ku2DH, Ku2DI, Ku2DJ, Ku2DK, Ku2DL, Ku2DM, Ku2DN, Ku2DO, Ku2DP, Ku2DQ, Ku2DR, Ku2DS, Ku2DT, Ku2DU, Ku2DV, Ku2DW, Ku2DX, Ku2DY, Ku2DZ, Ku2EA, Ku2EB, Ku2EC, Ku2ED, Ku2EE, Ku2EF, Ku2EG, Ku2EH, Ku2EI, Ku2EJ, Ku2EK, Ku2EL, Ku2EM, Ku2EN, Ku2EO, Ku2EP, Ku2EQ, Ku2ER, Ku2ES, Ku2ET, Ku2EU, Ku2EV, Ku2EW, Ku2EX, Ku2EY, Ku2EZ, Ku2FA, Ku2FB, Ku2FC, Ku2FD, Ku2FE, Ku2FF, Ku2FG, Ku2FH, Ku2FI, Ku2FJ, Ku2FK, Ku2FL, Ku2FM, Ku2FN, Ku2FO, Ku2FP, Ku2FQ, Ku2FR, Ku2FS, Ku2FT, Ku2FU, Ku2FV, Ku2FW, Ku2FX, Ku2FY, Ku2FZ, Ku2GA, Ku2GB, Ku2GC, Ku2GD, Ku2GE, Ku2GF, Ku2GG, Ku2GH, Ku2GI, Ku2GJ, Ku2GK, Ku2GL, Ku2GM, Ku2GN, Ku2GO, Ku2GP, Ku2GQ, Ku2GR, Ku2GS, Ku2GT, Ku2GU, Ku2GV, Ku2GW, Ku2GX, Ku2GY, Ku2GZ, Ku2HA, Ku2HB, Ku2HC, Ku2HD, Ku2HE, Ku2HF, Ku2HG, Ku2HH, Ku2HI, Ku2HJ, Ku2HK, Ku2HL, Ku2HM, Ku2HN, Ku2HO, Ku2HP, Ku2HQ, Ku2HR, Ku2HS, Ku2HT, Ku2HU, Ku2HV, Ku2HW, Ku2HX, Ku2HY, Ku2HZ, Ku2IA, Ku2IB, Ku2IC, Ku2ID, Ku2IE, Ku2IF, Ku2IG, Ku2IH, Ku2II, Ku2IJ, Ku2IK, Ku2IL, Ku2IM, Ku2IN, Ku2IO, Ku2IP, Ku2IQ, Ku2IR, Ku2IS, Ku2IT, Ku2IU, Ku2IV, Ku2IW, Ku2IX, Ku2IY, Ku2IZ, Ku2JA, Ku2JB, Ku2JC, Ku2JD, Ku2JE, Ku2JF, Ku2JG, Ku2JH, Ku2JI, Ku2JJ, Ku2JK, Ku2JL, Ku2JM, Ku2JN, Ku2JO, Ku2JP, Ku2JQ, Ku2JR, Ku2JS, Ku2JT, Ku2JU, Ku2JV, Ku2JW, Ku2JX, Ku2JY, Ku2JZ, Ku2KA, Ku2KB, Ku2KC, Ku2KD, Ku2KE, Ku2KF, Ku2KG, Ku2KH, Ku2KI, Ku2KJ, Ku2KK, Ku2KL, Ku2KM, Ku2KN, Ku2KO, Ku2KP, Ku2KQ, Ku2KR, Ku2KS, Ku2KT, Ku2KU, Ku2KV, Ku2KW, Ku2KX, Ku2KY, Ku2KZ, Ku2LA, Ku2LB, Ku2LC, Ku2LD, Ku2LE, Ku2LF, Ku2LG, Ku2LH, Ku2LI, Ku2LJ, Ku2LK, Ku2LL, Ku2LM, Ku2LN, Ku2LO, Ku2LP, Ku2LQ, Ku2LR, Ku2LS, Ku2LT, Ku2LU, Ku2LV, Ku2LW, Ku2LX, Ku2LY, Ku2LZ, Ku2MA, Ku2MB, Ku2MC, Ku2MD, Ku2ME, Ku2MF, Ku2MG, Ku2MH, Ku2MI, Ku2MJ, Ku2MK, Ku2ML, Ku2MN, Ku2MO, Ku2MP, Ku2MQ, Ku2MR, Ku2MS, Ku2MT, Ku2MU, Ku2MV, Ku2MW, Ku2MX, Ku2MY, Ku2MZ, Ku2NA, Ku2NB, Ku2NC, Ku2ND, Ku2NE, Ku2NF, Ku2NG, Ku2NH, Ku2NI, Ku2NJ, Ku2NK, Ku2NL, Ku2NM, Ku2NO, Ku2NP, Ku2NQ, Ku2NR, Ku2NS, Ku2NT, Ku2NU, Ku2NV, Ku2NW, Ku2NX, Ku2NY, Ku2NZ, Ku2OA, Ku2OB, Ku2OC, Ku2OD, Ku2OE, Ku2OF, Ku2OG, Ku2OH, Ku2OI, Ku2OJ, Ku2OK, Ku2OL, Ku2OM, Ku2ON, Ku2OO, Ku2OP, Ku2OQ, Ku2OR, Ku2OS, Ku2OT, Ku2OU, Ku2OV, Ku2OW, Ku2OX, Ku2OY, Ku2OZ, Ku2PA, Ku2PB, Ku2PC, Ku2PD, Ku2PE, Ku2PF, Ku2PG, Ku2PH, Ku2PI, Ku2PJ, Ku2PK, Ku2PL, Ku2PM, Ku2PN, Ku2PO, Ku2PP, Ku2PQ, Ku2PR, Ku2PS, Ku2PT, Ku2PU, Ku2PV, Ku2PW, Ku2PX, Ku2PY, Ku2PZ, Ku2QA, Ku2QB, Ku2QC, Ku2QD, Ku2QE, Ku2QF, Ku2QG, Ku2QH, Ku2QI, Ku2QJ, Ku2QK, Ku2QL, Ku2QM, Ku2QN, Ku2QO, Ku2QP, Ku2QQ, Ku2QR, Ku2QS, Ku2QT, Ku2QU, Ku2QV, Ku2QW, Ku2QX, Ku2QY, Ku2QZ, Ku2RA, Ku2RB, Ku2RC, Ku2RD, Ku2RE, Ku2RF, Ku2RG, Ku2RH, Ku2RI, Ku2RJ, Ku2RK, Ku2RL, Ku2RM, Ku2RN, Ku2RO, Ku2RP, Ku2RQ, Ku2RR, Ku2RS, Ku2RT, Ku2RU, Ku2RV, Ku2RW, Ku2RX, Ku2RY, Ku2RZ, Ku2SA, Ku2SB, Ku2SC, Ku2SD, Ku2SE, Ku2SF, Ku2SG, Ku2SH, Ku2SI, Ku2SJ, Ku2SK, Ku2SL, Ku2SM, Ku2SN, Ku2SO, Ku2SP, Ku2SQ, Ku2SR, Ku2SS, Ku2ST, Ku2SU, Ku2SV, Ku2SW, Ku2SX, Ku2SY, Ku2SZ, Ku2TA, Ku2TB, Ku2TC, Ku2TD, Ku2TE, Ku2TF, Ku2TG, Ku2TH, Ku2TI, Ku2TJ, Ku2TK, Ku2TL, Ku2TM, Ku2TN, Ku2TO, Ku2TP, Ku2TQ, Ku2TR, Ku2TS, Ku2TT, Ku2TU, Ku2TV, Ku2TW, Ku2TX, Ku2TY, Ku2TZ, Ku2UA, Ku2UB, Ku2UC, Ku2UD, Ku2UE, Ku2UF, Ku2UG, Ku2UH, Ku2UI, Ku2UJ, Ku2UK, Ku2UL, Ku2UM, Ku2UN, Ku2UO, Ku2UP, Ku2UQ, Ku2UR, Ku2US, Ku2UT, Ku2UU, Ku2UV, Ku2UW, Ku2UX, Ku2UY, Ku2UZ, Ku2VA, Ku2VB, Ku2VC, Ku2VD, Ku2VE, Ku2VF, Ku2VG, Ku2VH, Ku2VI, Ku2VJ, Ku2VK, Ku2VL, Ku2VM, Ku2VN, Ku2VO, Ku2VP, Ku2VQ, Ku2VR, Ku2VS, Ku2VT, Ku2VU, Ku2VV, Ku2VW, Ku2VX, Ku2VY, Ku2VZ, Ku2WA, Ku2WB, Ku2WC, Ku2WD, Ku2WE, Ku2WF, Ku2WG, Ku2WH, Ku2WI, Ku2WJ, Ku2WK, Ku2WL, Ku2WM, Ku2WN, Ku2WO, Ku2WP, Ku2WQ, Ku2WR, Ku2WS, Ku2WT, Ku2WU, Ku2WV, Ku2WW, Ku2WX, Ku2WY, Ku2WZ, Ku2XA, Ku2XB, Ku2XC, Ku2XD, Ku2XE, Ku2XF, Ku2XG, Ku2XH, Ku2XI, Ku2XJ, Ku2XK, Ku2XL, Ku2XM, Ku2XN, Ku2XO, Ku2XP, Ku2XQ, Ku2XR, Ku2XS, Ku2XT, Ku2XU, Ku2XV, Ku2XW, Ku2XX, Ku2XY, Ku2XZ, Ku2YA, Ku2YB, Ku2YC, Ku2YD, Ku2YE, Ku2YF, Ku2YG, Ku2YH, Ku2YI, Ku2YJ, Ku2YK, Ku2YL, Ku2YM, Ku2YN, Ku2YO, Ku2YP, Ku2YQ, Ku2YR, Ku2YS, Ku2YT, Ku2YU, Ku2YV, Ku2YW, Ku2YX, Ku2YY, Ku2YZ, Ku2ZA, Ku2ZB, Ku2ZC, Ku2ZD, Ku2ZE, Ku2ZF, Ku2ZG, Ku2ZH, Ku2ZI, Ku2ZJ, Ku2ZK, Ku2ZL, Ku2ZM, Ku2ZN, Ku2ZO, Ku2ZP, Ku2ZQ, Ku2ZR, Ku2ZS, Ku2ZT, Ku2ZU, Ku2ZV, Ku2ZW, Ku2ZX, Ku2ZY, Ku2ZZ.

Byk-F located 15cm below Byk-E is a pumiceous crystal tephra with a thickness of 5mm, and it corresponds to Byk-L (Hyodo et al., 2016). It contains hornblende, biotite, and the orthopyroxene crystals. The refractive indices of pumiceous type volcanic glass shards and hornblendes are  $n_1$ : 1.507-1.511 (mode 1.509) and  $n_2$ : 1.681-1.691 (1.686-1.687). These features are similar to that of YUT4 ( $n_1$ : 1.504-1.511 and  $n_2$ : 1.681-1.694 (1.685-1.686)) which locates under YUT5 correlated to Byk-E at the foot of the eastern slope of Older Ontake volcano (Takeshita et al., 2016). Because the major element composition of the volcanic glass shards from Byk-F and YUT4 is also corresponding well, the set of Byk-E and F can be correlated with the set of YUT5 and 4.

The tephra group assumed to be Ku5 by Mitsunashi et al. (1959) and WQSB (1996) in the Yoro river was correlated with Ku3, Ku4, and Ku4.5 based on the refractive indices of each unit and the major element composition of the volcanic glass shards (Nakazato et al., 2017). In this research, the crystal tephra Ku5B and the vitric tephra Ku5A were newly confirmed at the riverbed of Yoro river. The refractive indices of volcanic glass shards of Ku5A and hornblendes of Ku5B are  $n_1$ : 1.498-1.503, 1.505-1.512 (1.509), 1.525-1.536 and  $n_2$ : 1.662-1.676 (1.668-1.669). These values are corresponding to the

report of Nanayama et al. (2016). Ku6C, D, and E have already been confirmed at the upstream of these Ku5A and B (Nakazato et al., 2017). The horizons of the main marker tephras of the Kokumoto Formation in the Yoro river route became clear by the confirmation of Ku5A and B.