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characterized by a major calcareous nannofossil speciation episode and by the appearance of the calpionellid group: several genera and species first appear and rapidly evolve, showing an increase in diversity, abundance and, particularly, in calcification degree.

Biostratigraphic investigations have been performed directly on un-heated magneto-core end pieces as well as on samples collected specifically from the Jurassic/Cretaceous boundary interval. Calcareous nannofossil investigations have been performed on simple smear slides and ultra-thin sections (7-8 µm thick), while calpionellids have been investigated in the same thin sections used for nannofossils.

The J/K boundary interval at Torre de' Busi is represented by light brownish to whitish limestone belonging to the lowermost part of the Maiolica Formation, representing a lithified nanno-ooze also rich in calpionellids. Calcareous nannofossil *M.chiastius* Zone (Bralower *et al.*, 1989); *Crassicollaria* and *Calpionella* Zones (Remane, 1986; Pop, 1994; Reháková & Michalík, 1997) and CM19 and CM18 polarity chrons have been recognized across the J/K boundary. Four reliable and well-marked calcareous nannofossil datums have been identified: the FO of *N.wintereri* and *C.cuvillieri* both correlating with the middle part of CM19n; the FO of *N.steinmannii* minor at the top of CM19n and the FO of *C.octofenestratus* at the base of CM18r. The 'explosive' appearance of a monospecific association of small, globular *Calpionella alpina* (*C.alpina* "acme") has been identified in the uppermost part of CM19n. It is here emphasized that integrated stratigraphy based on calcareous nannofossil and capionellid events and magnetostratigraphy is a powerful tool for characterizing the J/K boundary interval at enhanced resolution, and is crucial for defining the J/K boundary.

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Key events around the J/K boundary of the Panboreal Superrealm, their correlative potential and relation with the base of the Berriassian [850]

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Choosing a GSSP, especially those marking boundary between two systems, involves searching for the best correlative levels and events worldwide. Here we review such key-levels which could be recognized through the Panboreal Superrealm.

Ammonites: FAD of true *Craspedites* of the *Okensis* group at the base of the Upper Volgian is recognised from N. Siberia to Svalbard and the Russian Platform. The next level is characterized by the appearance of short-lived *Volgidiscus* and coincides with the base of Lamplughi Zone. Records of this genus are known from eastern England to northern Siberia. Its precise range in the Sub–Polar Urals and northern Siberia is still unknown. The FAD of *Volgidiscus* seems to be very close to FAD of *Chetaites*. The base of the Ryazanian Stage is well-traced by FAD of *Praetollia*, providing accurate correlation through the Superrealm. In the same manner base of the Kochi Zone is recognized by the appearance of true *Hectoroceras* from England to northern Siberia.

Bivalves (Buchiids): The lower boundary of the *Buchia okensis* buchiazone is defined by the appearance of the index species. It is particularly clear and has been recognised from all the regions of the Panboreal superrealm. This level is very near to the base of the Kochi Zone, which is widespread in the boreal region. The *Okensis* buchiazone meets many requirements of a good stratigraphic indicator; it has reliable phylogenetic control, is easily determined in sections and has good correlation possibilities both for intraboreal and boreal-tethyan sequences.

Foraminifera: The Jurassic-Cretaceous boundary is not identified on foraminifera within the Panboreal Superrealm, but the base of the *Gaudryina gerkei*, *Ammobaculites gerkei* Zone corresponding to the middle part of Sibiricus Zone can be traced throughout the Arctic.

Dinocysts: There are several bioevents providing intraboreal correlation at two levels: FADs of *Dingodinium ?spinosum*, *Scriniodinium pharo* (base of the Upper Volgian) and FAD of *Spiniferites ramosus* (base of the Ryazainian), recognized in Siberia and N. Europe. Tethyan zonations are generally based on essentially different dinocyst successions, but the inception of *Spiniferites ramosus* is observed near the base of the Berriasian both in Boreal and Tethyan Realms.

Magnetostratigraphy: Recent advances in direct paleomagnetic correlation between Boreal and Tethyan successions reveal that the base of the Jacobi Zone corresponds to a level within the Boreal *Craspedites taimyrensis* Zone, while the base of the Kochi zone lies close to the base of the Occitanica Zone

Geochemical signatures: An Iridium anomaly, perhaps caused by the Mjolnir impact, can be traced from Northern Siberia to Svalbard, but it has not been identified elsewhere yet.

Conclusion: The J/K boundary identified in the Pan–Tethyan Superrealm can be traced through the Boreal areas only by means paleomagnetics. We have no distinctive biostratigraphically-based correlative levels near to the base of the Jacobi Zone, but the base of the Occitanica Zone more, or less, corresponds to the base of the *Hectoroceras kochi* and *Buchia okensis* zones and could be chosen as a good level for further GSSP of the base of the Cretaceous.

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The Late Cretaceous Arctic: A quantitative re-assessment based on plant fossils [851]

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In the context of the most recent age assignments, a review of Late Cretaceous megafossil floras from the palaeo-Arctic of northeastern Russia demonstrate close similarities to those of northern Alaska in terms of composition, structure and floral dynamics. This allows the circum-Arctic Ocean boreal forest, representing a diverse extinct ecosystem adapted to prolonged periods of total winter darkness (up to 5 months), to be characterised in great detail. The climate is quantitatively re-assessed from nine angiosperm-rich, predominantly Cenomanian to Coniacian circum-Arctic floras using Climate Leaf Analysis Multivariate Program (CLAMP) calibrated using a global gridded (0.5 x 0.5°) climate data set derived from that used in climate modelling. Climate interpretations for a further five floras from around 30 °N palaeolatitude in Europe are given for comparison purposes. These data, similar to previous estimates, support the existence of a cool northern Pacific Ocean cold gyre and a warm Arctic Ocean where sea surface temperatures in the warmest Coniacian interval was 6-10 °C, but in the Maastrichtian was closer to 0 °C (estimated uncertainty ± 5°C) with the likelihood of winter ice covering parts of a reduced salinity Arctic Ocean. The new estimates are in good agreement with a wide range of non-palaeobotanical climate proxies and render as an outlier warmer Arctic Ocean temperature estimates of over 15 °C in the Maastrichtian and 20°C in the Cenomanian derived from the TEX86 proxy. The CLAMP estimates also suggest high values for humidity and precipitation consistent with sedimentological indicators and, coupled with warm temperatures