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Mesoscale lightning in West African squall lines and its global detection with ELF measurements

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The MIT Doppler radar was installed in Niamey, Niger, Africa in summer 2006 for participation in the AMMA (African Monsoon and Multidisciplinary Analysis). The radar measurements were supplemented with ground based electrical and video camera measurements. A large number of energetic lightning flashes have been documented, primarily in the laterally extensive stratiform regions of squall lines that propagate westward in conjunction with African easterly waves. Many of these flashes developed after the radar bright band was well developed in the stratiform region. GPS clocking of these events has enabled their search and identification at remote ELF stations in Japan, Hungary and the USA. The paper is concerned with the characterization of these special lightning flashes and their squall line context. Contrast will also be made between lightning of this type in the African continent and with earlier results noted in the Amazon basin in 1999 during the NASA LBA experiment.