River **channel** and **overbank** sediments were collected from the Brahmaputra main stream (at five locations) and major tributaries, Subansiri, Jiabharali, Pagladia, BurhiDihing, Dikhow and Kopili (before confluence with the main stream) for grain size, bulk and clay mineralogy study. The grain size results show that most of the sediments in the Brahmaputra **channel** lie within the fine-to-very fine sand category (φ= 2.296 to 3.971), while the **overbank** sediments lie within sandy silt category (φ= 3.347 to 5.761) with very less clay (2-6%). Among the north bank tributaries (Subansiri, Jiabharali and Pagladia), Subansiri **channel** is dominated by fine sand (φ=2.909 to 2.932), Jiabharali (φ=3.221 to 3.423) and Pagladia (φ=3.656 to 3.989) by very fine sand (slightly gravelly) .**Overbank** sediments of these tributaries are dominated by very coarse silt. In the south bank tributaries (Burhidihing, Dikhow and Kopili), Burhidihing is dominated by very fine sand (φ= 3.716 to 3.731), Dikhow by medium and fine sand (φ= 2.018 to 2.176) and Kopili by very fine sand to coarse silt (φ= 4.157 to 4.123). The **overbank** sediments of these tributaries are dominated by very fine sand and coarse silt. The bulk mineral assemblage of the Brahmaputra **channel** is dominated by quartz, feldspars (orthoclase and plagioclase), mica and amphibole (hornblende). At some locations **overbank** sediments contain calcite, dolomite and apatite in addition to the above minerals. The results show that the clay mineral compositions of the Brahmaputra River display a similar pattern at all the sampling locations, with illite being dominant (relative abundance 50 to 58%), chlorite (12 to 41%) and kaolinite (10 to 22%) being lesser abundant, and smectite being minor component. Kaolinite concentration increases and chlorite concentration decreases from Pasighat to Dhubri indicating increasing trend of hydrolysis along the river. Clay mineralogy shows distinct differences in the tributaries, which correspond to the heterogeneous source rocks and weathering intensity of the drainage. The

Himalayan tributaries are dominated by illite-chlorite and south bank tributaries by kaolinite, smectite being the minor component in all the tributaries.