The compositional properties of the human genome have been extensively studied. These analyses focused mainly in isochores. With the availability of the human genome and several molecular techniques, new studies were performed, showing that nucleotide composition is related to three processes: gene expression, replication and recombination. Nevertheless, these studies usually focused on regions at the sub-chromosomal level. Here we study the compositional differences among chromosomes, considering structural and functional aspects using the chromosomes as the units of analysis. We show that: (i) chromosomes are compositionally consistent units; (ii) there exists a correlation between their GC content and size and location within the nucleus, and (iii) the three processes mentioned above are linked with compositional properties at the chromosomal level. These results support the existence of a link between composition and spatial/structural functional features of entire chromosomes. The evolutionary mechanisms and forces underlying these patterns remain as an open question.