Piçarras (a vernacular term for podzols) occur along the South Eastern coastal zone of Brazil between Rio Grande do Sul and Rio de Janeiro States. Piçarras are formed as a result of cementation of the soil B horizon formed on mostly sandy littoral barrier sediments covered by the lush Atlantic forest. The cementing material is composed by the mixture of sesquioxides (2-4%) and humic material exhibiting the elemental C content between 1 and 3%, calculated per dry weight of the sediment. It is assumed that the colonization of the accreted littoral bodies by vegetation occurred rapidly and contributed to the accumulation of humic material.

Our study was carried out along a 3 km trench profile, perpendicular to the shore line in Volta Velha which is a private biological reserve area situated in the municipal district of Itapoá, in the northeast of Santa Catarina State, and is part of the area considered as the Atlantic Forest Biosphere Reserve. The investigated trench profile is also roughly perpendicular to the front of prograding Holocene barriers composed of fine to medium sand weekly cemented by humic material and sesquioxides produced by the weathering of heavy minerals. 14 samples were collected from the studied transect and submitted to inorganic, and organic elemental analyses, lipid extract GC-MS determination based on flash pyrolisis and $^{13}$C nuclear magnetic resonance (NMR) characterisation of organic matter, which was further dated by 14C AMS method.

Most of the intensity in the solid-state $^{13}$C NMR spectrum of the both VV1 and VV2 analysed samples is detected in the chemical shift region of alkyl C between 45 and 0 ppm. This regions is most tentatively assigned to methylene groups i.e. in fatty or amino acids but also in paraffinic structures. Comparable high intensity is seen in the chemical shift region of Carboxyl/carbonyl C, which is also assignable to amide C. A smaller signal at 205 ppm can be attributed to aldehyde or ketone C. Considering the low ratio between the intensity of in the carbonyl/carbonyl C region and the alkyl C region, a high contribution of long chain alkyl structures is unlikely. A further strong signal can be seen at 130 ppm, assignable to unsubstituted aromatic C. The signal between 140 and 160 ppm derives from O/N-aryl C as it occurs in phenolic structures for example of lignin or tannins. The signal at 55 ppm is only visible as a shoulder and may derive from NH-C of peptide structures but is also attributable to methoxyl groups i.e. in lignin side chains.

The signal at 75 ppm in the chemical shift region of O-alkyl C (110 to 60 ppm) originates most likely from carbohydrates. The low relative contribution of this signal indicates a high humification degree of the sample VV1. Comparing the samples VV1 and VV2 we observed a clear time dependent decrease in the carbohydrate content, most probably reflecting the time of exposure of organic matter to bacterial respiration.

Three AMS 14C datings of the B horizon material taken at 80 cm depth, at the inland margin of the accreted area ca 2.6 km, 1.4 km and 0.5 km from shore gave the ages of 6.890-6.670 (VV1), 2.690-2.340 (VV2) and 1300 – 1170 (VV7) Cal BP. The starting point of the sequence corresponds to the period antecedent to the mid-Holocene highstand which occurred between 5800 - 5000 Cal BP. The first period of costal accretion embracing the time span between the points VV1 and VV2 corresponds to a slower (0.28 m/yr) progradation. Indeed the deceleration of the sea level rise provided only limited space for accommodation of sand bodies. During the second more recent period marked by the samples VV2 and VV7 the accretion is much faster (0.64 m/yr) because the lowering of the RSL permitted the formation of the broad prograding barriers. The presented results after further confirmation and refinements in sampling technique open new perspectives for the development of a new geochronological tool based on dating of fast accumulates soil organic matter.