present in the Punilla region, where indoor radon data are absent. The Punilla region occurs in a valley, where a large uranium deposit occurs at the eastern margin. Even though the location of this deposit is well-known since the 1960s, parts of the suburbs of the main cities of the region are located above it.

The aim of this project is thus to provide the first systematic analysis of radon flow in the Gran Mendoza and Punilla areas. Radon passive detectors will be used to quantify indoor radon concentration, whereas field mapping of radon flow and gamma ray will be carried out using portable radon and gamma detectors. Consequently, a model of uranium and radon distribution and geochemical cycle for the studied areas will be obtained, allowing to provide unprecedented environmental constraints to evaluate epidemiological data and establish potential mitigation strategies. In the long term, this work is the first step towards the establishment of national surveys of radon flow and associated regulations.

Tracing groundwater dynamics using a multi-isotope (δ18O, δ2H, 14C, 3H, and 4He-81Kr) approach in the complex groundwater system of the Baixo Pardo Grande Basin

Groundwater, Residence Time, Stable Isotopes, Noble Gas
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The combined use of multiple isotopes is a powerful tool for the assessment of complex groundwater systems (CGS), because the differentiated information carried by the isotopes helps to track the adaptations promoted by the interconnection between the reservoirs. In this study, we used the hydrogeological context of the Baixo Pardo Grande Basin as a CGS. The basin is located in the northeastern portion of the São Paulo State and inserted within the geological Paraná Basin framework. The main hydrogeological units are: Guarani, Serra Geral and Bauru aquifer systems (thereafter GAS, SGAS and BAS). The GAS is completely confined by the SGAS, which is a semi-confined aquifer overlain by the unconfined BAS in the western portion of the basin. The database consists of one hundred groundwater samples, from eight different studies, that present stable isotope ($\delta^{18}O$ and $\delta^{2}H$) and twenty of them also present estimated residence time calculated from radiocarbon (^{14}C), tritium (^{3}H), and noble gases (^{4}He-^{81}Kr chronometer). The GAS has an isotopic fingerprint of $\delta^{18}O$ = -8.60 ± 0.78 ‰ and $\delta^{2}H$ = -57.74 ± 4.44 ‰ (28 samples), while SGAS has $\delta^{18}O$ = -7,26 ± 0.78 ‰ and $\delta^{2}H$ = -47.18 ± 5.07 ‰ (36 samples) and BAS has $\delta^{18}O$ = -7.21 ± 0.51 ‰ and $\delta^{2}H$ = -47.10 ± 2.65 ‰ (36 samples). Groundwater isotopic composition were compared to the Local Meteoric Water Line (LMWL) from Rio Claro GNIP station ($\delta^{2}H$ = 8.05 ± 0.1 $\delta^{18}O$ + 13.08 ± 0.5 ‰), the closest to the study area, and groundwater $\delta^{18}O$ isoscapes were constructed for each aquifer using the kriging spatial interpolation method. The residence time was estimated to be over 22,600 years up to 127,000 years for the GAS (7 samples), modern up to 2,500 years for the SASG (7 samples), and over 30 years up to 60 years for the BAS (6 samples). In general, the younger groundwater, recharged after 1986, has a more enriched isotopic fingerprint from shallower wells (depths less than 170 m). The more recent groundwater is from BAS and SGAS, recharged after 1990, and located near the outcrop limits of the aquifer units. BAS and SGAS exhibit similar isotopic fingerprints, located aligned to the LMWL of Rio Claro or below it. This suggests direct recharge from rainfall and the occurrence of evaporation process during recharge. Meanwhile, the older groundwater has a more depleted isotopic composition, mostly from SGAS and GAS, and deeper wells (ranging from 170 m up to 1,200 m). The depleted isotopic signatures from BAS and SGAS can be spatially related to the more depleted isotopic signature from GAS. In the case of BAS, it may be related to past subsidence events in the southwestern part of the basin near the Turvo River, which may allow the mixing with deeper groundwater. For SGAS, the depleted signatures are clustered in the eastern part of the basin where the SGAS is unconfined and the GAS is shallower. This supports the hypothesis of groundwater mix between SGAS and GAS due to similar water heads. Therefore, the

multi-isotope approach highlights important aspects of the CGS in the basin. These insights can promote a more sustainable groundwater resource management, particularly for the GAS, a non-renewable reservoir connected to unconfined aquifers. It is important to note that these findings may also be supported by other types of data, such as potentiometric maps, hydrochemical and hydrodynamic descriptions.

δ13C, δ15N and TOC/TN as indicators of the origin of organic matter in Sepetiba Bay (SE Brazil)

Stable isotopes, Organic matter sources, Pollution, Coastal System, Sediments
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Sepetiba Bay (SB), located in Rio de Janeiro State, is one of the Brazilian coastal regions most impacted by anthropogenic activities due to increased population density, the installation of tourist and industrial mega-developments, and essential port, agricultural and fishing activities. SB have been suffering, between 1970 to date, an accelerated degradation process becoming moderately to severely polluted by Potentially Toxic Elements (PTEs). The urban and industrial development around the bay is the cause of its degradation. The Potential Ecological Risk Index (PERI) suggests high and very high ecological risk in the inner and middle areas of Sepetiba Bay by PTEs. Silting and eutrophication are other aspects, that affect this bay due to the human activities. A coastal environment receives organic matter from various sources. It is therefore of interest to discriminate the sources of organic matter to better understand the eutrophication processes. For this reason, this work, which involved the meticulous analysis of total organic carbon (TOC), total nitrogen (TN), the carbon-nitrogen ratio (TOC/TN), carbon isotope (δ13C), nitrogen isotope (δ15N) and grain size in 50 samples of surface sediments collected in Sepetiba Bay in May 2022 and in four sediment cores, represents a significant scientific endeavor that ensures the reliability and accuracy of the findings. The values of δ13C, δ15N and C/N indicate that the organic matter found on the surface sediment of SB are characteristic of sewage, bacterial and marine productivity and a mixture of mangroves and terrigenous sources predominantly from plants with a C3 photosynthetic pattern. These findings are not just scientific observations, but they provide a comprehensive understanding of the sources of organic matter in Sepetiba Bay, a heavily impacted coastal region. The identification of sewage-related sources in cores SP3 and SP5 in sediment layers deposited since 1915 and their absence in older sediments, for example, before the middle Holocene (indicated by data from core SP10), and in areas outside the bay in both surface and sub-surface sediments, as revealed by the data from core SP9, is a significant step towards understanding the eutrophication processes and the degradation of the ecological quality of the sediments. These results underscore the detrimental effects of the discharge of domestic sewage into the inner region of the SB, highlighting the urgent need for environmental management measures.