



Site selection for the future stations of the french permanent broadband network

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RESIF (REseau Sismologique et géodésique Français) is a new French research infrastructure dedicated to the observation of earth deformation based on seismic and geodetic instruments mainly located in France. One of its major component, called RESIF-CLB (Construction Large Bande), is devoted to the evolution of the permanent seismic broadband network in metropolitan France with the objective to complement the 45 existing stations with ~155 new stations within the next eight years. This network will be used for various scientific objectives including deep structures imaging and national seismicity monitoring. The chosen network topology consists in a backbone of homogeneously distributed stations (long wavelength array) completed by additional stations in seismically active regions. Management of the RESIF-CLB project is carried out by the technical division of INSU (Institut National des Sciences de l'Univers) who will rely on eight regional observatories and the CEA-LDG for the construction and operation of the stations. To optimize the performance of the network, we put a strong emphasis on the standardization of the stations in term of vault types, scientific and technical instrumentation and operation procedures. We also set up a procedure for site selection requiring that every potential site has to be tested for at least 3 weeks with a minimalist installation. Analysis of the continuous ambient noise records is then included in a standardized report submitted to all committed partners for acceptance.

During the last two years, about 60 potential new sites have been tested, spanning various places and environments. We present a review of the seismic noise measurements at these sites and discuss the influence of different types of noise sources depending on the frequency band of interest. For example, we show that regional population distribution can be used as a proxy to infer the noise level at frequencies higher than 1 Hz. Based on similar noise analyses at existing permanent sites, we also discuss the fair benefit of our site testing procedure for the estimation of the long period noise level once the station is settled.