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The International Terrestrial Reference Frame: lessons from the past and preparation for the future.

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Since the beginning of the ITRF activities, continuous improvements have been made in order to ensure the best attainable accuracy of the successive ITRF solutions. These improvements are due to progress made in both data analysis by the individual techniques and the combination strategy. However, we are still far from the science requirement of 1 mm and 0.1mm/yr accuracy and stability over time of the ITRF defining parameters. A critical review of past ITRF results (including the ITRF2008) will be summarized and plans for future improvements will be discussed. Among other issues, the paper synthesizes the accuracy of the frame origin and scale and the current situation of co-location sites and local ties. Results of data analysis of extended time series beyond the ITRF2008 time-span, from SLR and VLBI in particular, will be used to examine the origin and the scale temporal behavior and their consistency with ITRF2008 results. A re-evaluation of the consistency between local ties and space geodesy data will also be undertaken.