

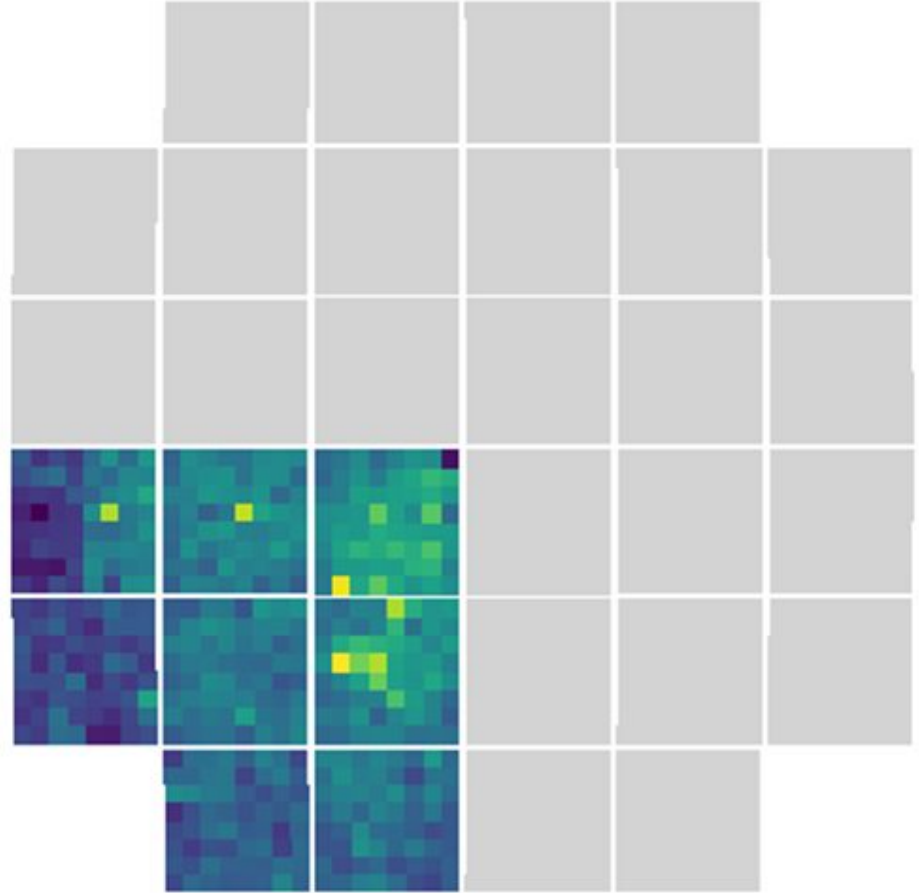
Oscillations on the Slow Signal data of QCAMi@Tenerife

Quick analysis results by Lisa Ferro and David Spyra
(DESY)

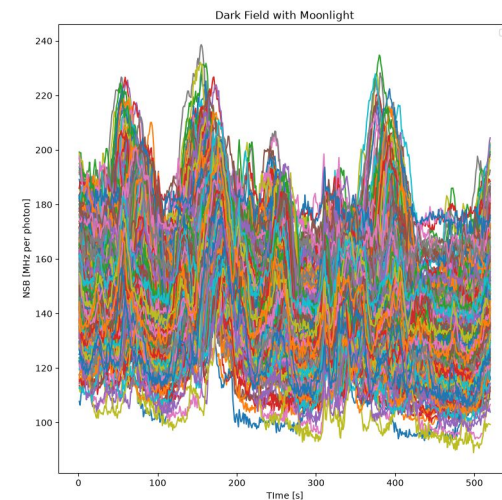
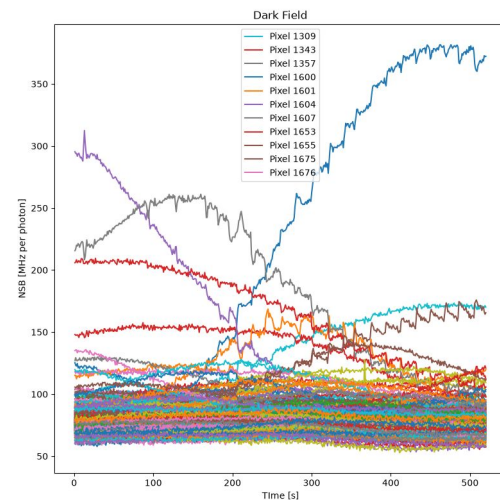
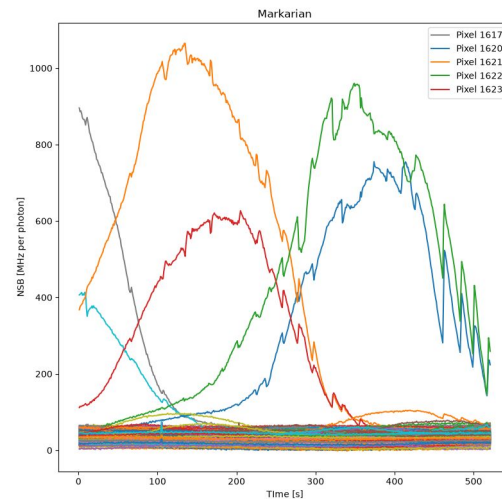
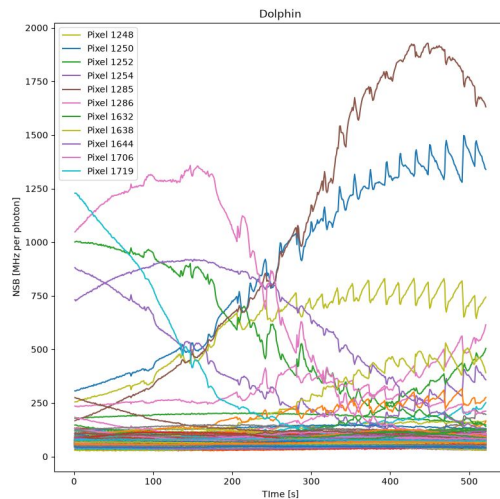


SOME REMINDERS:

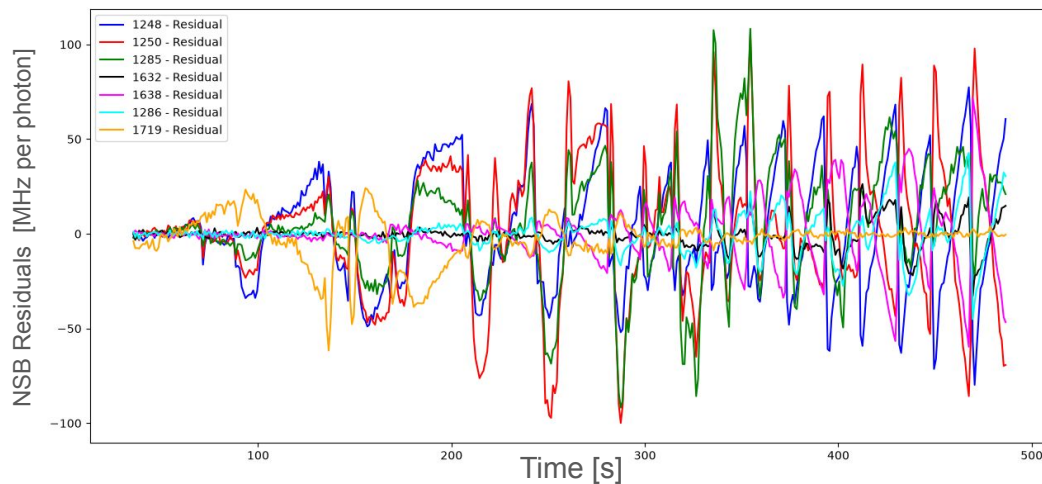
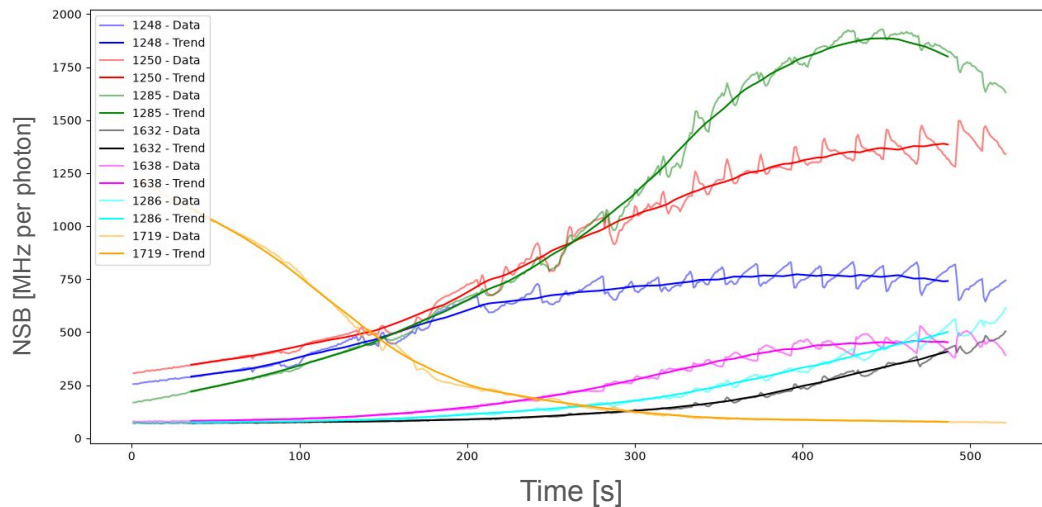
- SST Slow Signal data: Photo current per pixel, integrated on 1 ms and sent out at a constant rate (=1 Hz)
- QCAMi: Prototype of the full SSTCAM, with $\frac{1}{4}$ of the detection modules and a simplified Backplane
- All the following plots refer to Slow Signal measurements from the QCAMi on-sky campaign on ASTRI2 (July 2025)



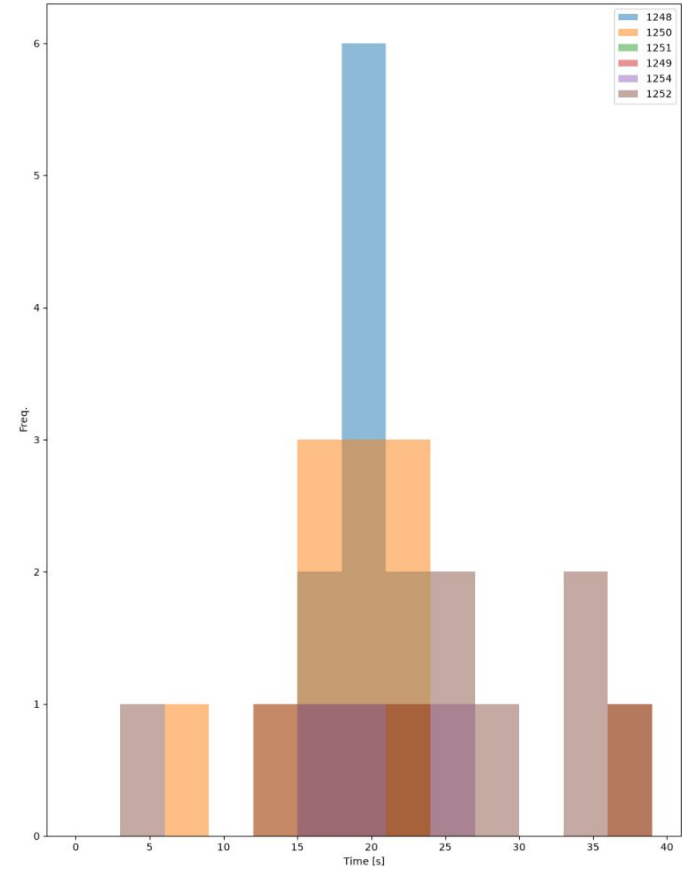
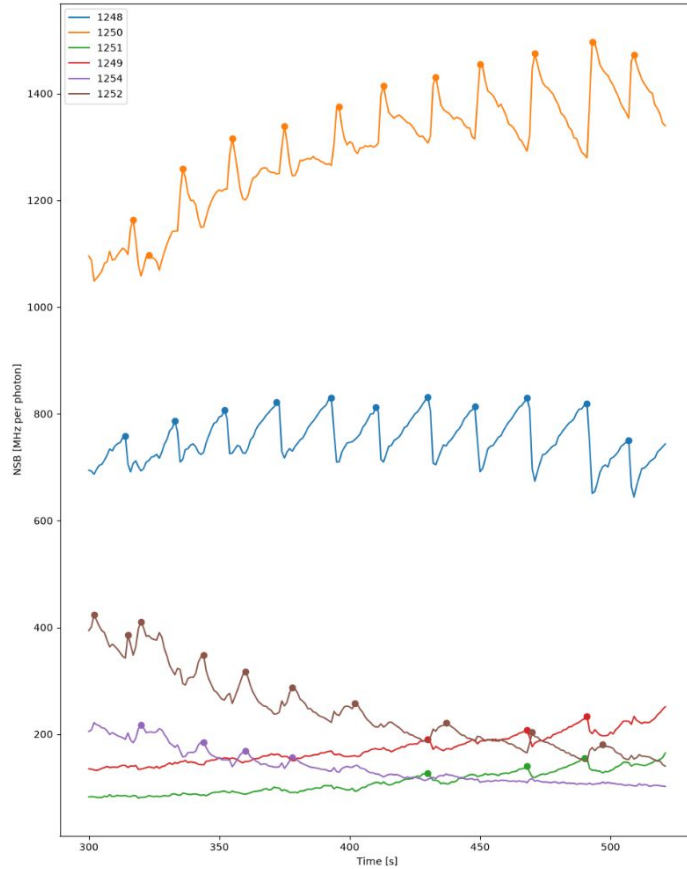
- Analysing the photo current per pixel as function of time, we found some weird oscillations on some pixels, on many different fields
- Oscillations shows a “sawtooth” pattern
- Each observation is 10 minutes long



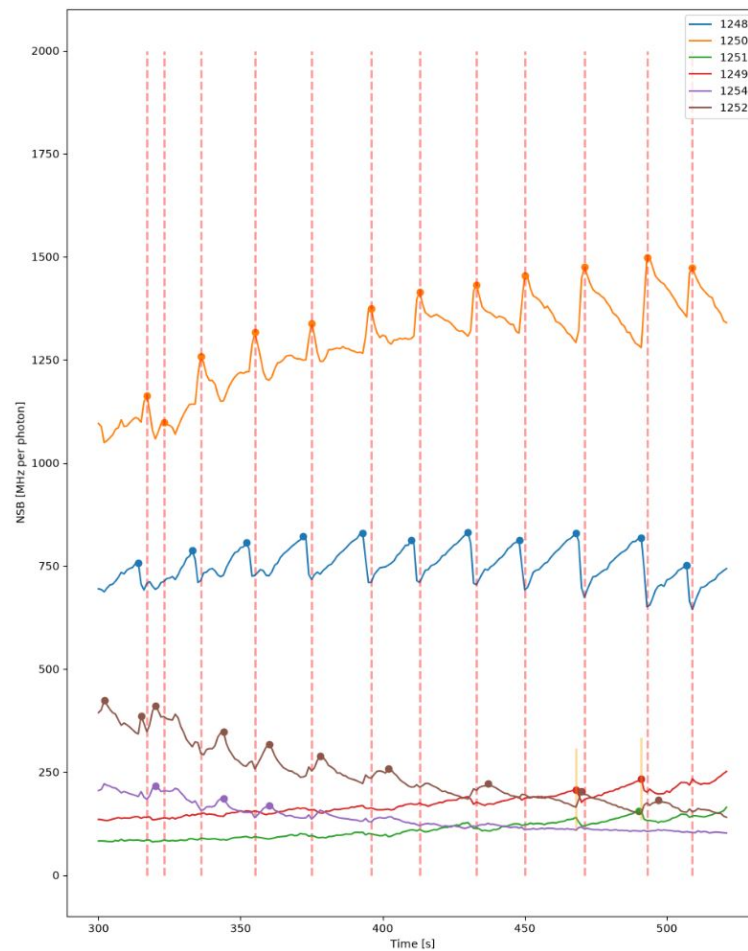
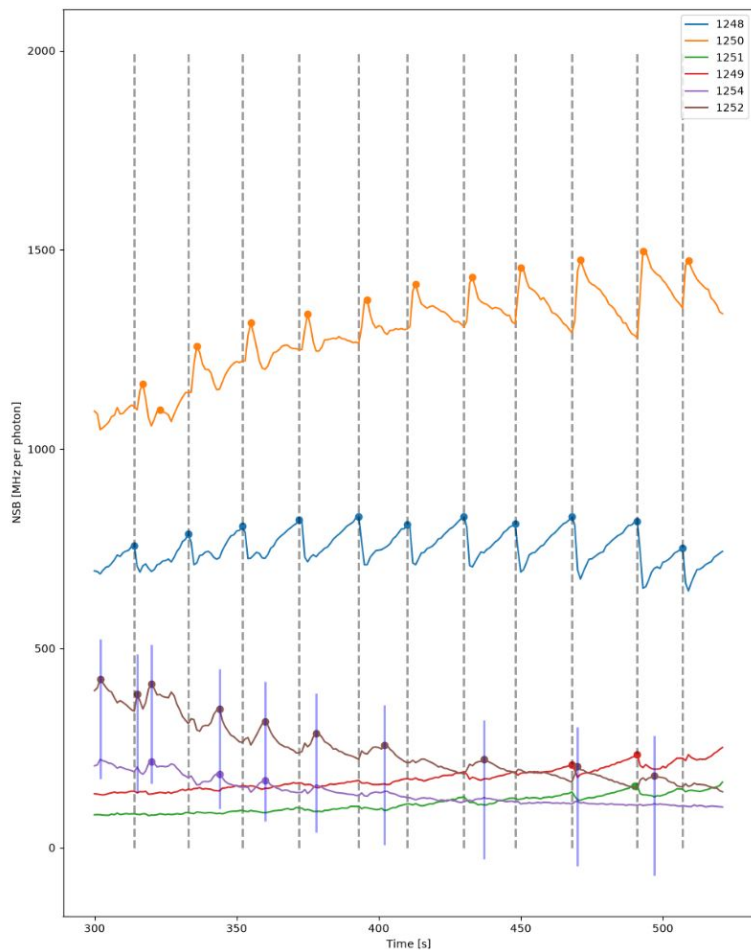
- By removing the trend due to the field rotation, we are left with a clear residual obscillation



- Rough period analysis on some selected pixels gives us $\langle T \rangle = (20.5 \pm 0.2) \text{ s}$

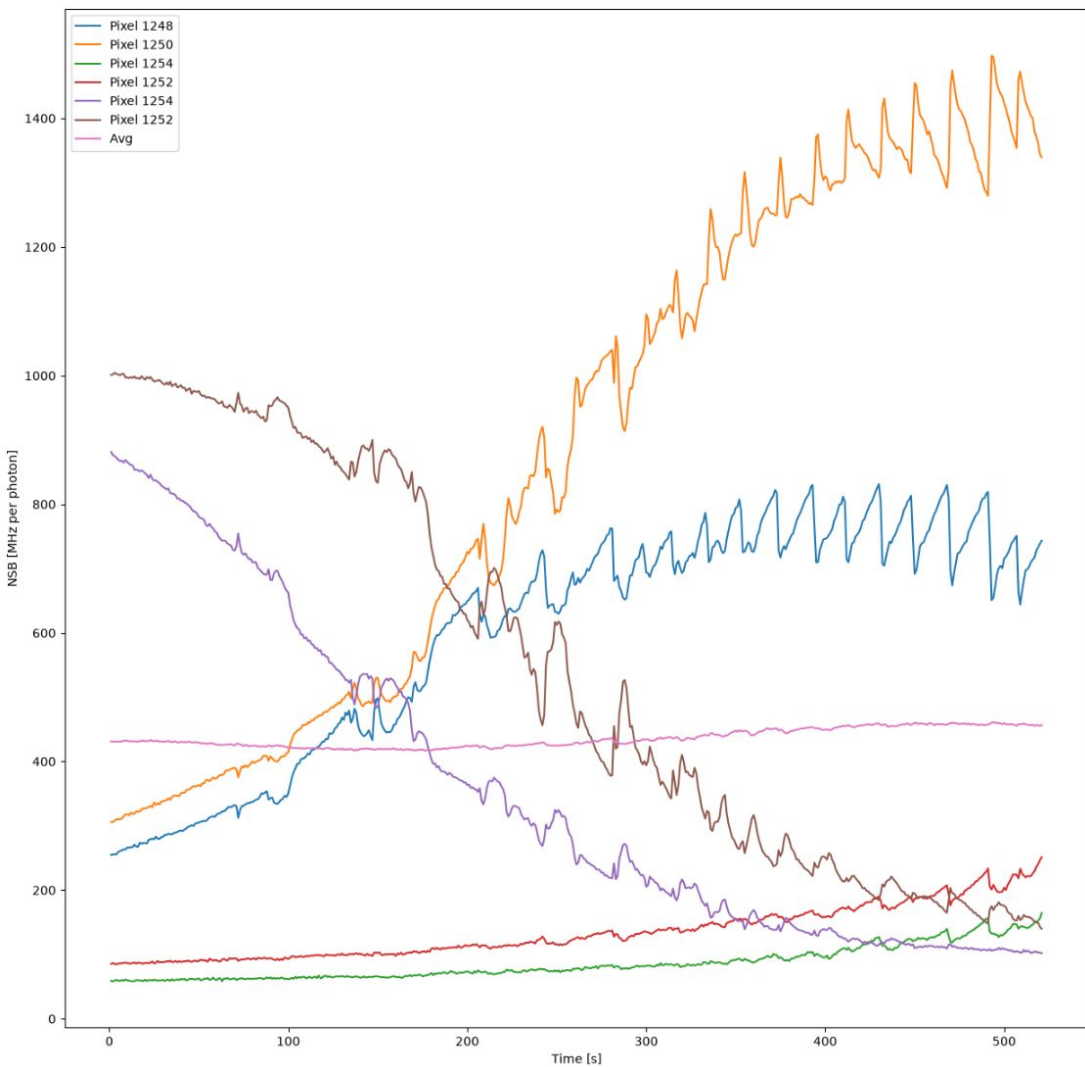


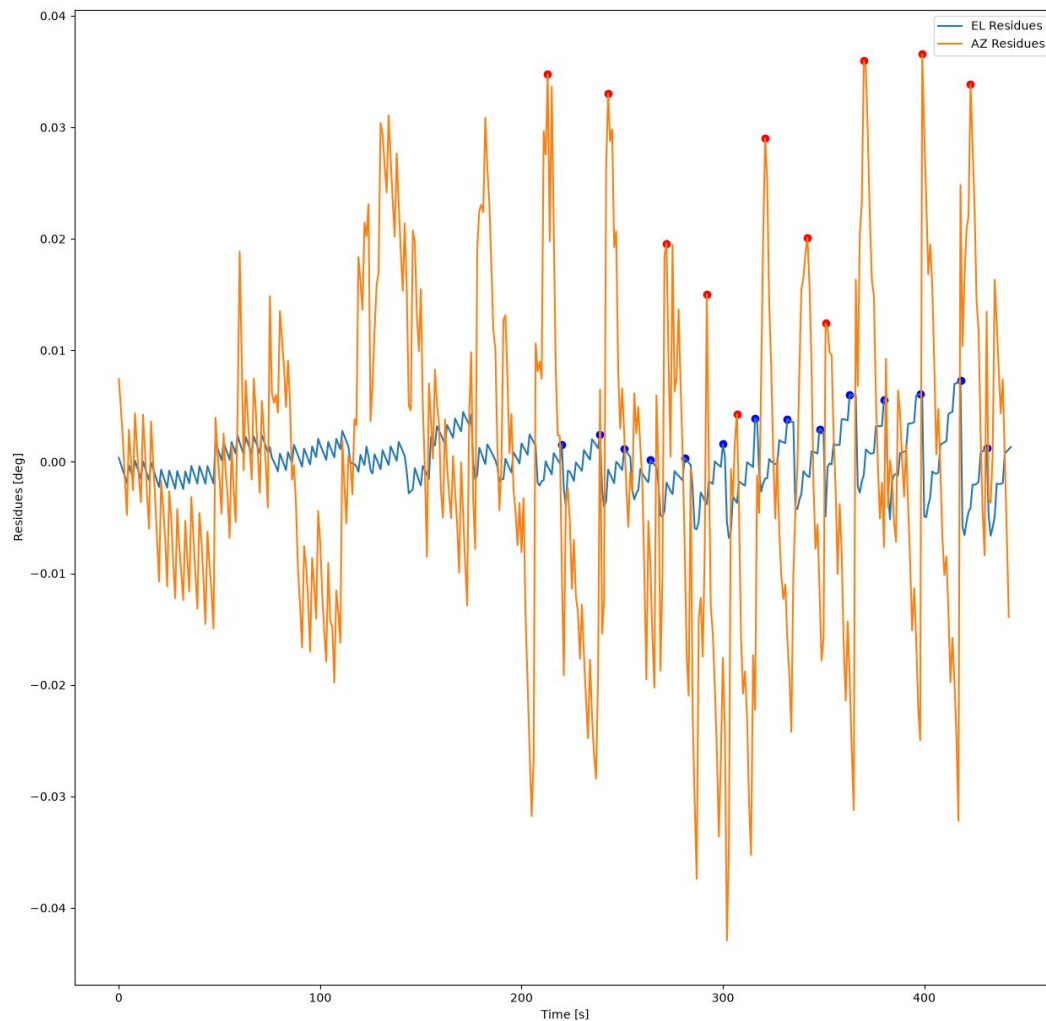
- Oscillations seems to line up among different pixels...



Summing up nearby pixels in a region illuminated by a star we find out that the oscillations cancel each other out

1950 1948 1940 1942 1979 1978 1980 1982 1630 1628 1620 1622 1659 1658 1660 1662 1246 1244 1236 1238 1275 1274 1276 1278	
1951 1949 1943 1941 1976 1977 1981 1983 1631 1629 1623 1621 1656 1657 1661 1663 1247 1245 1239 1237 1272 1273 1277 1279	
1945 1947 1939 1937 1971 1968 1974 1973 1625 1627 1619 1617 1651 1648 1654 1653 1241 1243 1235 1233 1267 1264 1270 1269	
1946 1944 1938 1936 1969 1970 1972 1975 1626 1624 1618 1616 1649 1650 1652 1655 1242 1240 1234 1232 1265 1266 1268 1271	
1925 1926 1933 1934 1967 1965 1963 1962 1605 1606 1613 1614 1647 1645 1643 1642 1221 1222 1229 1230 1263 1261 1259 1258	
1924 1927 1932 1935 1966 1964 1961 1960 1604 1607 1612 1615 1646 1644 1641 1640 1220 1223 1228 1231 1262 1260 1257 1256	
1921 1920 1930 1931 1959 1958 1952 1955 1601 1600 1610 1611 1639 1638 1632 1635 1217 1216 1226 1227 1255 1254 1248 1251	
1922 1923 1929 1928 1957 1956 1954 1953 1602 1603 1609 1608 1637 1636 1634 1633 1218 1219 1225 1224 1253 1252 1250 1249	
2014 2012 2004 2006 2043 2042 2044 2046 1694 1692 1684 1686 1723 1722 1724 1726 1310 1308 1300 1302 1339 1338 1340 1342	
2015 2013 2007 2005 2040 2041 2045 2047 1695 1693 1687 1685 1720 1721 1725 1727 1311 1309 1303 1301 1336 1337 1341 1343	
2009 2011 2003 2001 2035 2032 2038 2037 1689 1691 1683 1681 1715 1712 1718 1717 1305 1307 1299 1297 1331 1328 1334 1333	
2010 2008 2002 2000 2033 2034 2036 2039 1690 1688 1682 1680 1713 1714 1716 1719 1306 1304 1298 1296 1329 1330 1332 1335	
1989 1990 1987 1998 2031 2029 2027 2026 1669 1670 1677 1678 1711 1709 1707 1706 1285 1286 1293 1294 1327 1325 1323 1322	
1988 1991 1996 1999 2030 2028 2025 2024 1668 1671 1676 1679 1710 1708 1705 1704 1284 1287 1292 1295 1326 1324 1321 1320	
1985 1984 1984 1995 2023 2022 2016 2019 1665 1664 1674 1675 1703 1702 1696 1699 1281 1280 1290 1291 1319 1318 1312 1315	
1986 1987 1983 1992 2021 2020 2018 2017 1666 1667 1673 1672 1701 1700 1698 1697 1282 1283 1289 1288 1317 1316 1314 1313	
1758 1756 1748 1750 1787 1786 1788 1790 1374 1372 1364 1366 1403 1402 1404 1406	
1759 1757 1751 1749 1784 1785 1789 1791 1375 1373 1367 1365 1400 1401 1405 1407	
1753 1755 1747 1745 1779 1776 1782 1781 1369 1371 1363 1361 1395 1392 1398 1397	
1754 1752 1746 1744 1777 1778 1780 1783 1370 1368 1362 1360 1393 1394 1396 1399	
1733 1734 1741 1742 1775 1773 1771 1770 1349 1350 1357 1358 1391 1389 1387 1386	
1732 1735 1740 1743 1774 1772 1769 1768 1348 1351 1356 1359 1390 1388 1385 1384	
1729 1728 1738 1739 1767 1766 1760 1763 1345 1344 1354 1355 1383 1382 1376 1379	
1730 1731 1737 1736 1765 1764 1762 1761 1346 1347 1353 1352 1381 1380 1378 1377	



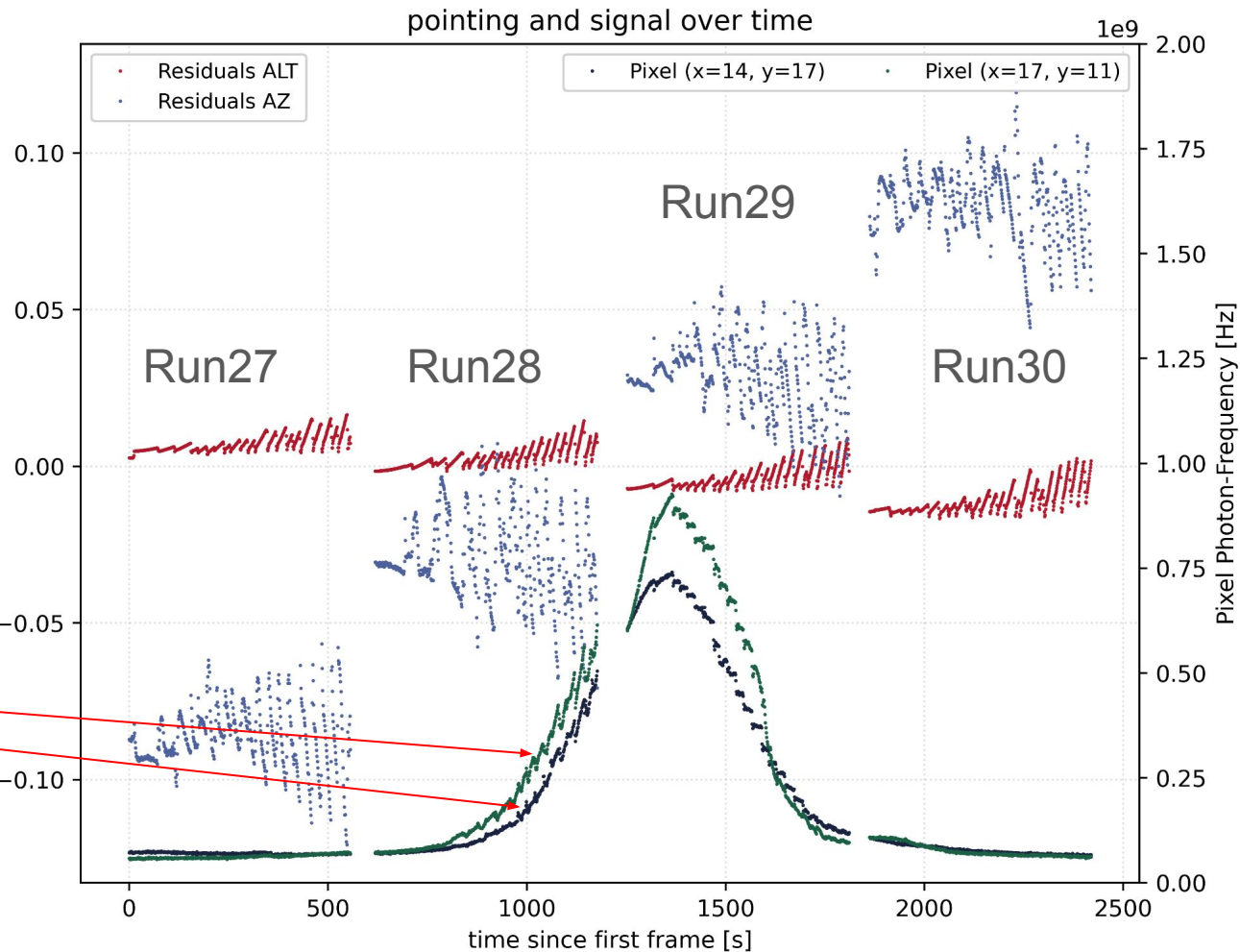
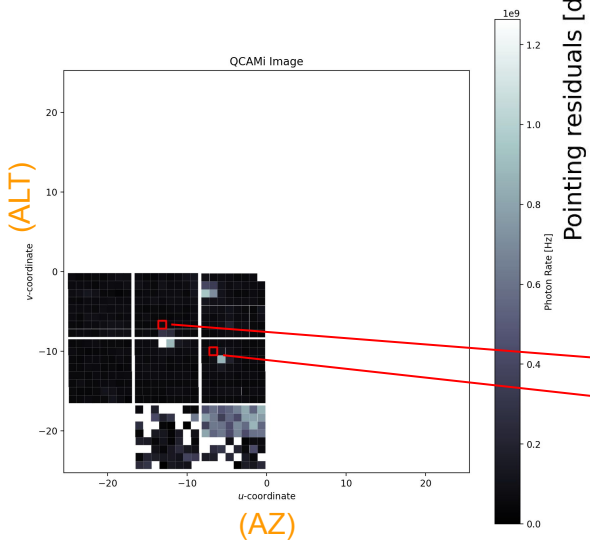


We checked if it could be related to different environmental parameters of the observation, and we found some similar oscillations on the measured telescope ELEVATION and AZIMUTH

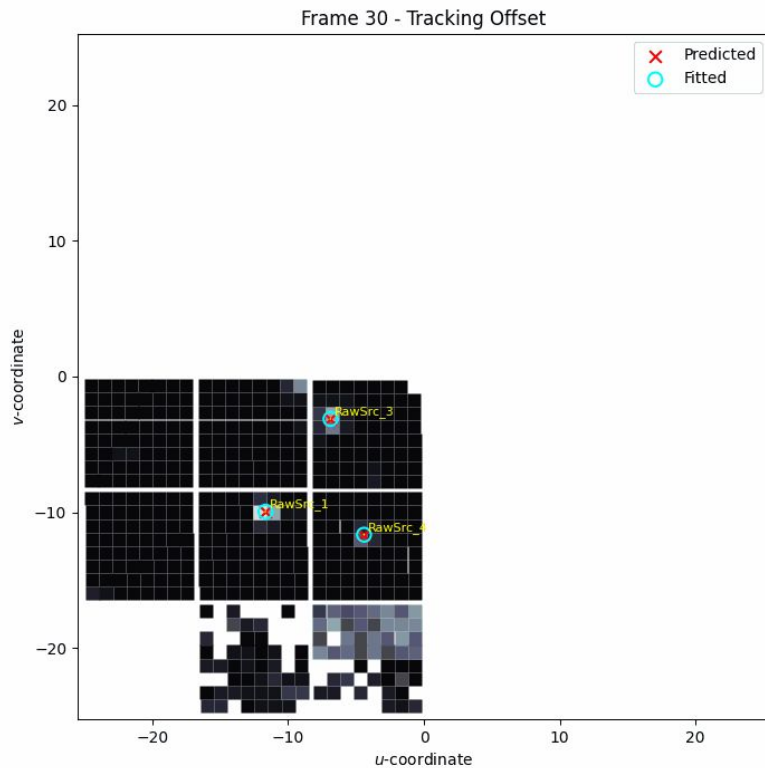
Rough analysis gives us:
 $\langle T \rangle_{AZ} = (21.0 \pm 0.8) \text{ s}$
 $\langle T \rangle_{EL} = (16.2 \pm 0.2) \text{ s}$

Comparison:

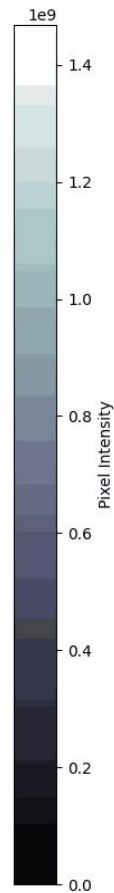
- Encoder positions
 - ALT, AZ
- Star intensities
 - Telescope “wobbles” cause stars to move in and out of pixels



(ALT)

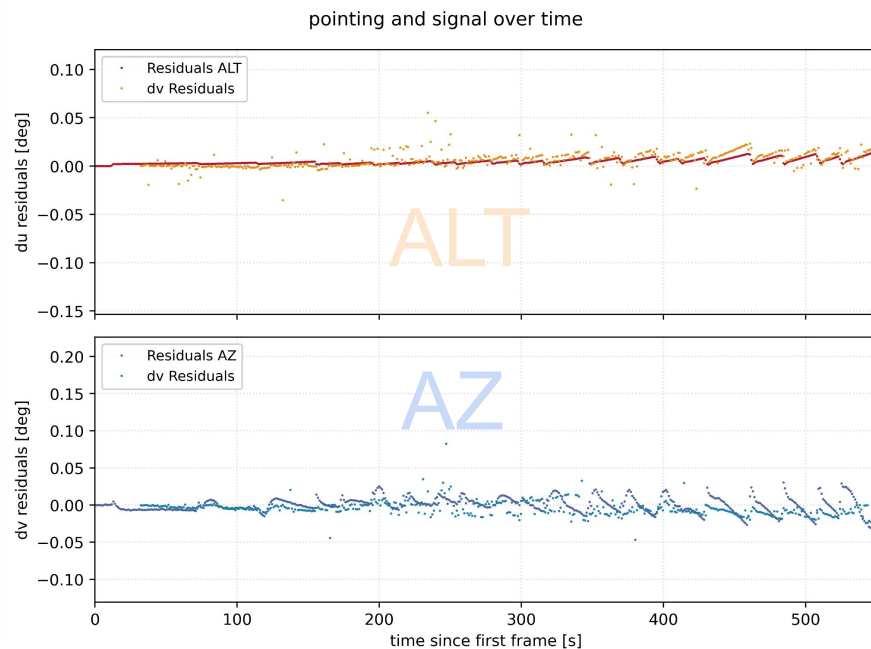


(AZ)

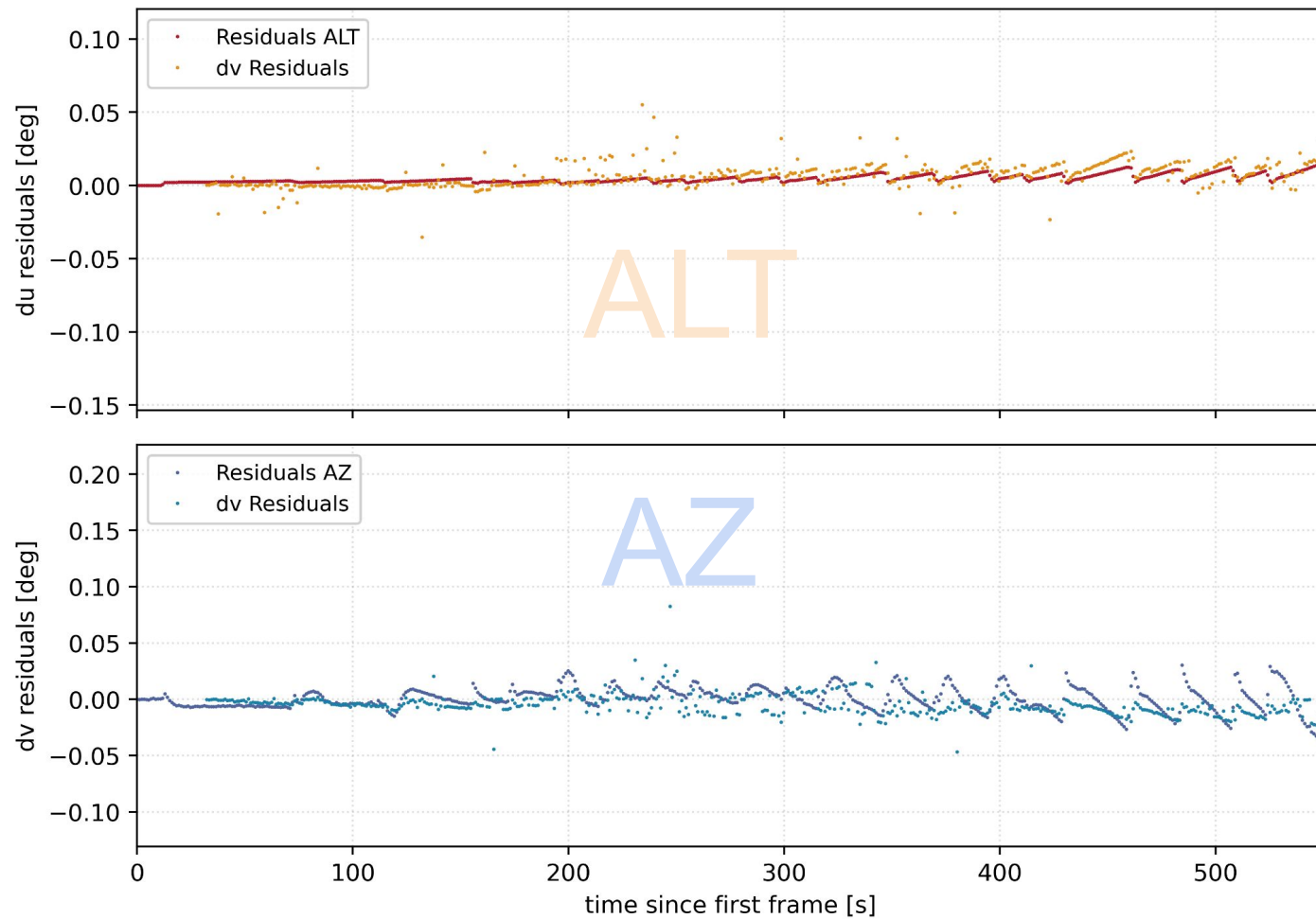


Tracked Star position vs Expected position

- Stars are identified in the initial image
- The positions are tracked assuming ideal field rotation
- Offsets to the expected positions are measured



pointing and signal over time



BACKUP SLIDES

PSD of signals

