DMQC Report Template
LaTeX Guidelines

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This document includes basic information about using the LaTeX software to generate DMQC report in .pdf format. LaTeX is free, typesetting system. It includes features designed for the production of technical and scientific documentation. More details about this software can be found in https://www.latex-project.org/.

To use the LaTeX in Windows you need to install two programs MikTeX and editor e.g.Texmaker.

MikTeX is an up-to-date implementation of TeX/LaTeX and related programs.

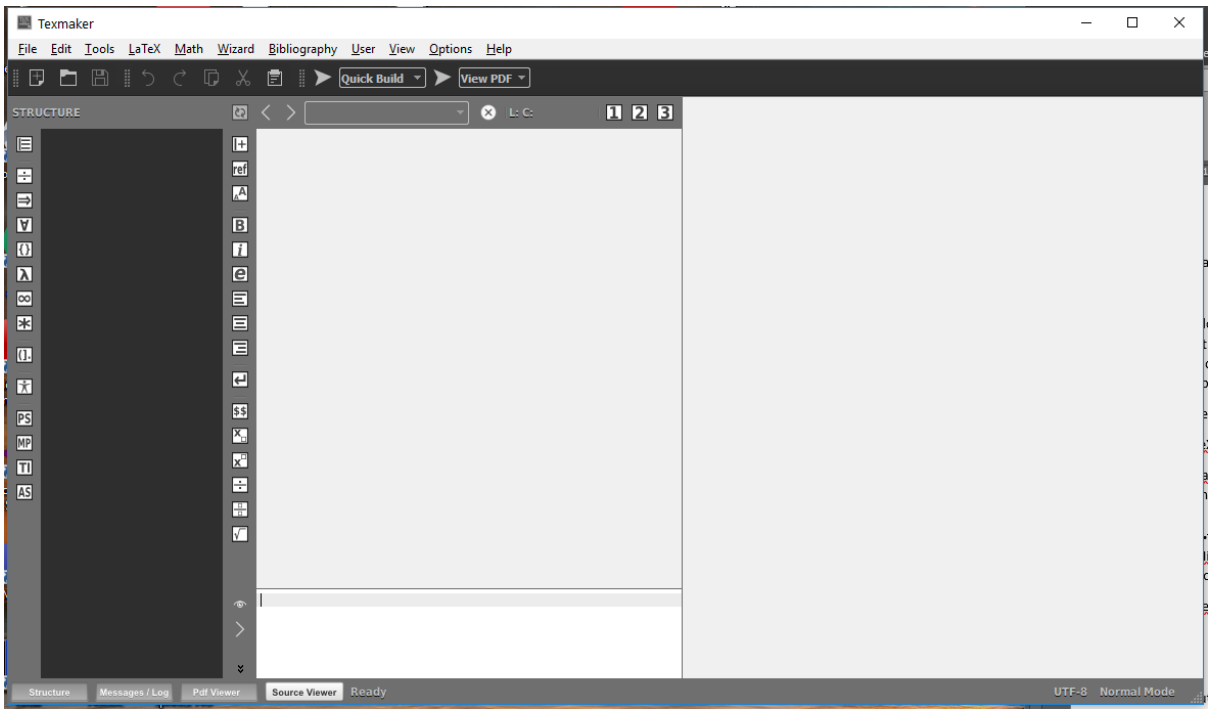
Texmaker is a free, modern and cross-platform LaTeX editor for Linux, macOS and Windows systems that integrates many tools needed to develop documents with LaTeX.

1. Installation of MikTeX and Texmaker

The MikTeX can be downloaded from https://miktex.org/download. If you want a step-by-step guide on how to install this software, go to https://miktex.org/howto/install-miktex.

The Texmaker can be downloaded from https://www.xm1math.net/texmaker/download.html.

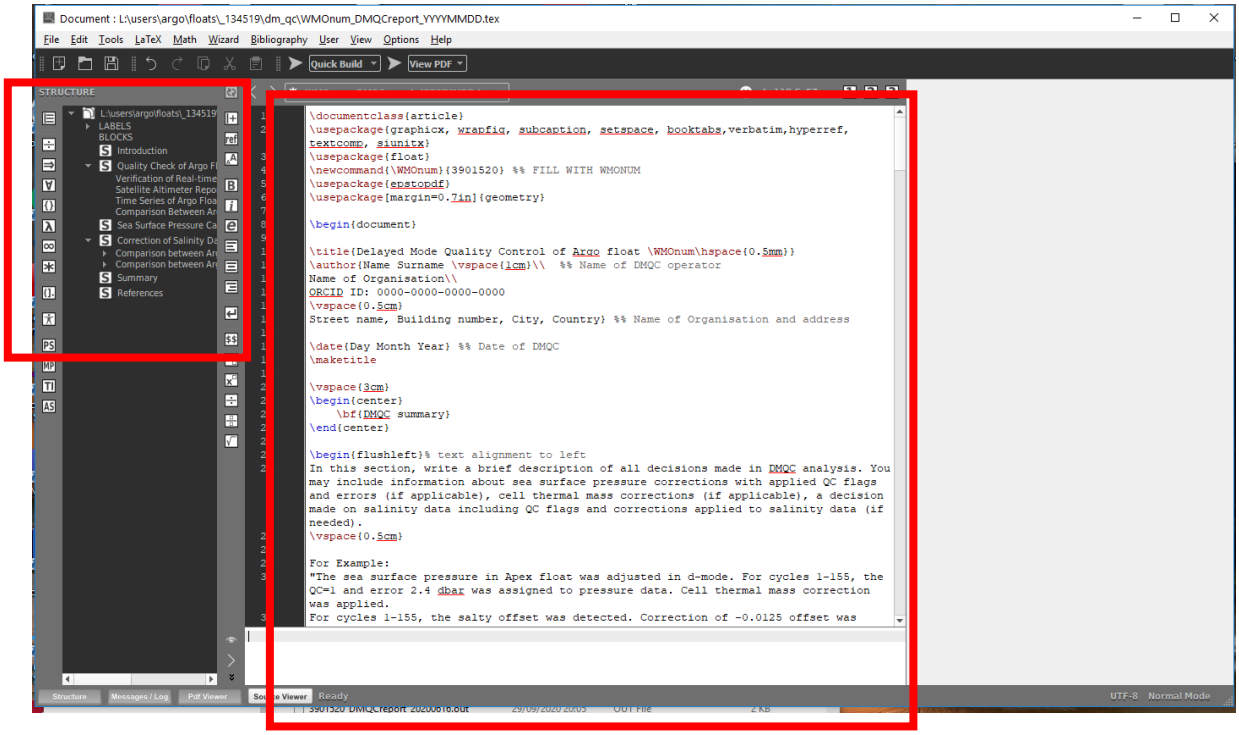
After the installation, both programs open the Texmaker editor.



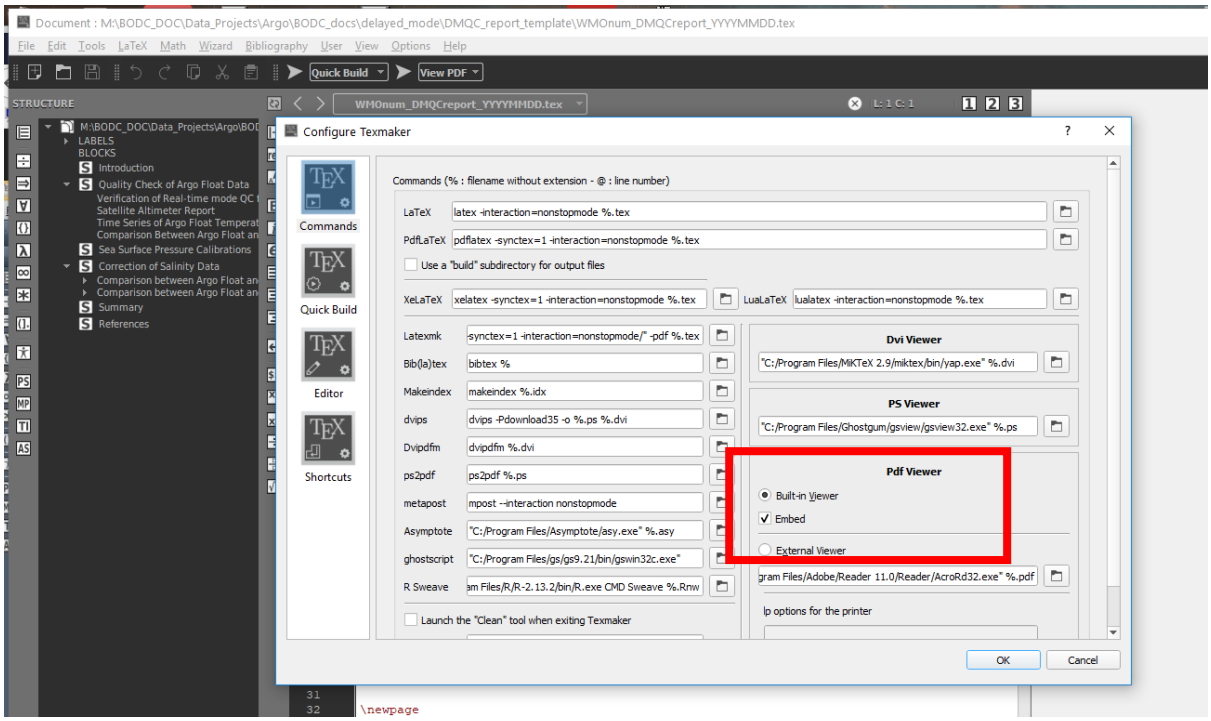
2. The first run of the code

Then to open the DMQC report template go to **File-> Open** and navigate to **WMOnum_DMQCreport_YYYYMMDD.tex** document.

The left side of the window is the structure area. The template of the code is in the middle window.

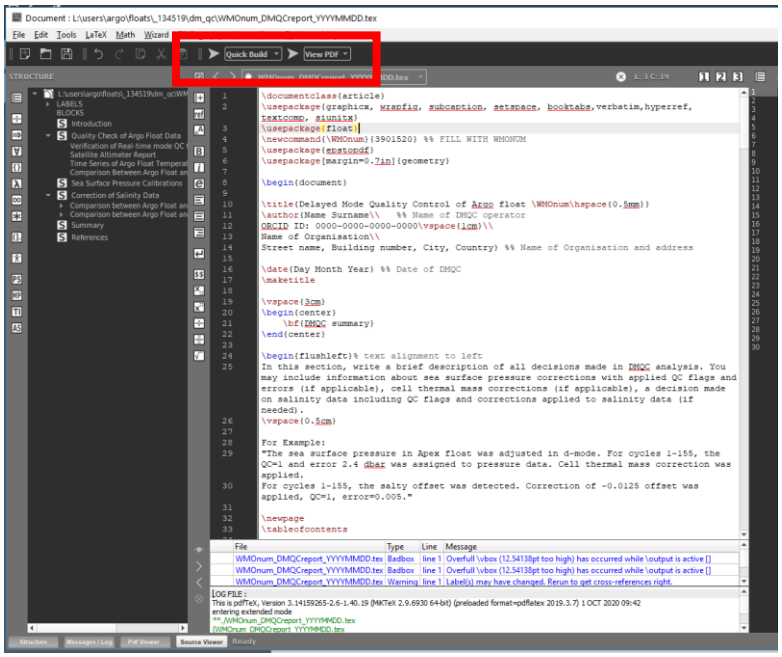


If you would like to have a view on your PDF document next to your code go to **Option-> Configure Texmaker** and click **Embed**. Then the PDF document will be displayed on the right side from the code.

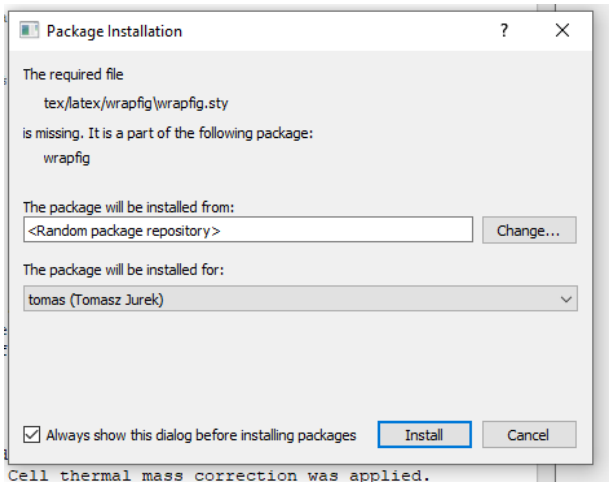


3. Installing packages

To compile the code and generate PDF document, click **Run** arrow icon from the panel or go to **Tools->Quick build (F1)**.

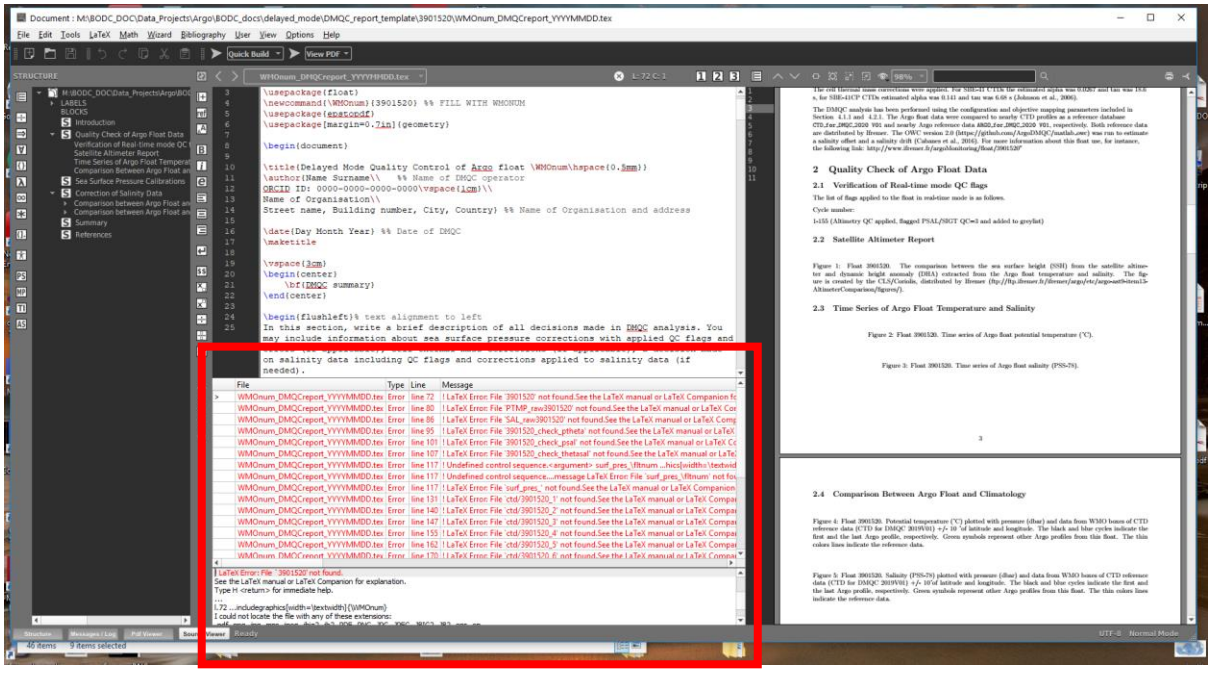


However, in your first run of the code, you may not have some packages needed to run it. To install the packages, after clicking the Run Quick build, you will see a pop-up window **Package Installation.** After clicking **Install** software will automatically install one of them. This window will appear for every missing package. After the package installation, your code should be ready to use.

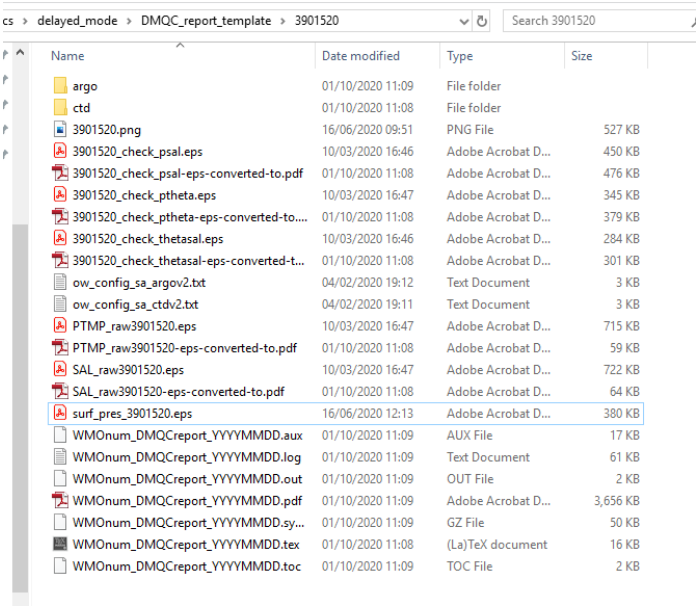


4. Attaching plots and configuration files

The next step is to attach all the plots and additional files that you would like to include in the report. Otherwise, the pdf will be still generated, but no plots will be displayed and several errors messages will be generated.



Place the report in the location of all plots used in DMQC analysis of float. Then again run Quick build arrow icon.



5. Editing code for your usage

Provide the changes to the code in the following sections:

5.1 Header

Insert your float number, Name, Surname, ORCID ID, name and location of your organisation, date and also a summary of all calibrations and decision made to your float.

```
\documentclass{article}
\usepackage{graphicx, wrapfig, subcaption, setspace, booktabs,verbatim,hyperref, textcomp, siunitx}
\usepackage{float}
\newcommand{\WMOnum}{3901520} %% FILL WITH WMONUM
\usepackage{epstopdf}
\usepackage[margin=0.7in]{geometry}

\begin{document}

\title{Delayed Mode Quality Control of Argo float \WMOnum\hspace{0.5mm}}
\author{Name Surname\\   %% Name of DMQC operator
ORCID ID: 0000-0000-0000-0000\vspace{1cm}\\
Name of Organisation\\
Street name, Building number, City, Country} %% Name of Organisation and address

\date{Day Month Year} %% Date of DMQC
\maketitle

\vspace{3cm}
\begin{center}
    \bf{DMQC summary}
\end{center}

\begin{flushleft}% text alignment to left
In this section, write a brief description of all decisions made in DMQC analysis. You may include information about sea surface pressure corrections with applied QC flags and errors (if applicable), cell thermal mass corrections (if applicable), a decision made on salinity data including QC flags and corrections applied to salinity data (if needed).
\vspace{0.5cm}

For Example:
"The sea surface pressure in Apex float was adjusted in d-mode. For cycles 1-155, the QC=1 and error 2.4 dbar was assigned to pressure data. Cell thermal mass correction was applied.
For cycles 1-155, the salty offset was detected. Correction of -0.0125 offset was applied, QC=1, error=0.005."

\newpage
\tableofcontents

\newpage
\section{Introduction}
```

File	Type	Line	Message

5.2 Introduction

Provide some details about any additional checks/tests and additional calibrations done on the float (if there was any), DMQC method, and reference data used in the analysis.

```
\tableofcontents

\newpage
\section{Introduction}

Briefly write any necessary information about the float, any steps performed before the
DMQC analysis, version and type of the reference data, DMQC software and if there any CTD
data from deployment was used as a reference data.
\vspace{0.5cm}

For Example:
" This report includes the delayed mode analysis performed for float \hspace{0.5mm}
\WMOnum. Before the analysis, real-time QC flags were visually inspected and modified if
necessary. Then, the satellite altimeter comparison plot between the sea surface height
and dynamic height anomaly, constructed for this float by Ifremer, was analysed. Another
step was to generate the plots of temperature and salinity time series and plots of
temperature, salinity and density plotted against the nearby historical CTD profiles
(\texttt{CTD\_for\_DMQC\_2019V01)}.

\medskip
Float \WMOnum\hspace{0.5mm} is the Apex float, where the pressure sensor is not auto-
corrected to zero while at the sea surface, hence the pressure data in was corrected
during processing in delayed mode. The procedures of correction sea surface pressure are
described in Argo Quality Control Manual for CTD and Trajectory Data (Wong et al., 2020).

\medskip
The cell thermal mass corrections were applied. For SBE-41 CTDs the estimated alpha was
0.0267 and tau was 18.6 s, for SBE-41CP CTDs  estimated alpha was 0.141 and tau was 6.68 s
(Johnson et al., 2006).

\medskip
The DMQC analysis has been performed using the configuration and objective mapping
parameters included in Section ~\ref{Configuration1} and ~\ref{Configuration2}. The Argo
float data were compared to nearby CTD profiles as a reference database \texttt{CTD\_for
\_DMQC\_2020 V01} and nearby Argo reference data \texttt{ARGO\_for\_DMQC\_2020 V01},
respectively. Both reference data are distributed by Ifremer. The OWC version 2.0
\href{url}{(https://github.com/ArgoDMQC/matlab\_owc)} was run to estimate a salinity
offset and a salinity drift (Cabanes et al., 2016). For more information about this float
use, for instance, the following link:
\href{url}{http://www.ifremer.fr/argoMonitoring/float/\WMOnum}"

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%\newpage
\section{Quality Check of Argo Float Data}
```

5.3 Quality check of Argo float data and additional calibrations

In this section, provide any details and plots of additional checks such as real-time QC flags, satellite altimeter report, time series of temperature and salinity.

If you are not doing additional quality check in real-time or your float does not need additional sea surface pressure calibration just write a short comment and remove the figure caption code.

```
%\newpage
\section{Quality Check of Argo Float Data}
\subsection{Verification of Real-time mode QC flags}

The list of flags applied to the float in real-time mode is as follows.

\medskip
Cycle number:

\medskip
1-155 (Altimetry QC applied,  flagged PSAL/SIGT QC=3 and added to greylist)


%\newpage
\subsection{Satellite Altimeter Report}
\begin{figure}[H]
    \centering
    \includegraphics[width=\textwidth]{\WMOnum}
    \caption{Float \WMOnum. The comparison between the sea surface height (SSH) from the satellite altimeter and dynamic height anomaly (DHA) extracted from the Argo float temperature and salinity. The figure is created by the CLS/Coriolis, distributed by Ifremer (ftp://ftp.ifremer.fr/ifremer/argo/etc/argo-ast9-item13-AltimeterComparison/figures/).}
    \label{Altim}
\end{figure}
\subsection{Time Series of Argo Float Temperature and Salinity}
%text
\begin{figure}[H]
    \centering
    \includegraphics[width=\textwidth]{PTMP_raw\WMOnum}
    \caption{Float \WMOnum. Time series of Argo float potential temperature (\textdegree C).}
    \label{TempWaterflow}
\end{figure}
\begin{figure}[H]
    \centering
    \includegraphics[width=\textwidth]{SAL_raw\WMOnum}
    \caption{Float \WMOnum. Time series of Argo float  salinity (PSS-78).}
    \label{SALWaterflow}
\end{figure}
%\newpage
\subsection{Comparison Between Argo Float and Climatology}
%text
```

File	Type	Line	Message
WMOnum_DMQCreport_YYYYMMDD.tex	Badbox	line 1	Overfull \vbox (12.54138pt too high) has occurred while \output is active [1

5.4 Configurations

To avoid any typing mistakes in writing configurations information, just load entire .txt files by changing the name of the .txt file in CTD and Argo Configuration section.

```
of data.}
    \label{surf_press}
\end{figure}

\newpage
\section{Correction of Salinity Data}
\subsection{Comparison between Argo Float and CTD Climatlogy}
\subsubsection{Configuration}
\label{Configuration1}
\verbatiminput{ow_config_sa_ctdv2.txt}
\subsubsection{Results} \label{results_CTD}
\begin{figure}[H]
    \centering
    \includegraphics[width=\textwidth]{ctd/\WMOnum_1}
    \caption{Float \WMOnum. Location of the float profiles (red line with coloured 
numbers) and the CTD reference data selected for mapping (blue dots). The black contours 
indicate the bathymetry at 0, 200, 1000 and 2000 m.}
    \label{trajectoryCTD}
\end{figure}

\newpage
%CTD comparison
\begin{figure}[H]
    \centering
    \includegraphics[width=\textwidth]{ctd/\WMOnum_2}
    \caption{Float \WMOnum. The Plot the original float salinity and the objectively 
estimated reference salinity at the 10 float theta levels that are used in calibration.}
    \label{uncalibVsSalinity}
```

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
% Argo
\subsection{Comparison between Argo Float and Argo Climatlogy}
\subsubsection{Configuration}
\label{Configuration2}
\verbatiminput{ow_config_sa_argov2.txt}

\subsubsection{Results}\label{results_ARGO}
%\subsection{Trajectory}
\begin{figure}[H]
    \centering
    \includegraphics[width=\textwidth]{argo/\WMOnum_1}
```

5.5 Summary

Provide a summary of scientific analysis and setups added in set_calseries that keep records of the decision made process in applying the corrections to float and also to give some help to other DMQC users for the training purposes to understand the behaviours of float.

```
\newpage
\section{Summary}
Write the summary of any problems with float and decision made on this float including
e.g. Is the float still active? Where is float located and what is the trajectory over its
lifetime? Has it crossed through different water masses, changed latitude, etc? Is the
float on the grey list? If DMQC has been done on some profiles before what decisions have
been made and if anything has changed? What was the setup used in set\_calseries.m? Did
you run any more code iterations with different configurations? If yes how it helped you
to make a final decision?
\vspace{0.5cm}

For example: "Float was deployed in the Brazil Basin. For most of life, this float stayed
in the system of local eddies. The most favourable water masses, which are useful for
comparison with climatology is relatively stable intermediate waters from around 400-900
m. The initial comparison between Argo float data reference data from CTD data shows that
salinity data are within its variability, however, slightly shifted toward saltier values
of CTD data. The sea surface pressure data are not displaying values below 0 dbar,
however, there are no indications of negative pressure drift.

\medskip
The comparison with satellite altimeter data suggested some potential offset between the
sea surface height and dynamic height anomaly, which were further verified by comparing
Argo data with Argo reference data using the OWC method. This float was not DMQC-ed
before. In set\_calseries.m we set the maximum of barks to -1 to show evidence of
suspected offset. The CTD referenced data were too limited and too variable to detect any
offset. Much clearer result was obtained by comparing Argo float data to Argo reference
data. The OWC analysis showed indications of salty offset. Argo data from this float are
of around 0.0125 saltier that reference data. The offset of -0.0125 was  applied to
salinity data and submitted to GDAC. This float is still active and further monitoring is
still required."

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%need to get to sit at the end of the document
%\newpage
\section{References}

Cabanes, C., Thierry, V., \& Lagadec, C. (2016). Improvement of bias detection in Argo
float conductivity sensors and its application in the North Atlantic. Deep-Sea Research
Part I: Oceanographic Research Papers, 114, 128-136. \href{url}{https://doi.org/10.1016/
j.dsr.2016.05.007}

\bigskip
```