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Correction

Article title: Validation of the Interfacial Area Transport Equation Coupled with the Void Transport Equation for Prediction of Flashing Flows
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An error has been made in the calculation of the interfacial area concentration with the correlations from RELAP5 and TRACE. Corrections have been made accordingly to reflect the updated results.

Correction 1

Location: Abstract
Corrected text:
The RELAP5 correlation is able to predict the interfacial area concentration more accurately than the TRACE correlation. The one-group decoupled IATE, supplied with experimental void fraction, shows overprediction of interfacial area concentration, especially at low-pressure conditions.

Correction 2
Location: Section IV.A, Paragraphs 2 and 3
Corrected text:
The RELAP5 correlation is observed to be able to predict the interfacial area concentration more accurately than the TRACE correlation, which shows consistent overprediction across all pressure levels. The RELAP5 predictions are observed to match the experimental data well, especially at higher axial locations. Furthermore, the accuracy of the prediction improves as system pressure increases. On the other hand, the TRACE correlation is observed to produce relatively constant prediction of interfacial area concentration along the flow channel. The correlation also appears to be less sensitive to changing system pressure as the predicted values do not show significant changes, especially in the intermediate and elevated pressure conditions. The significant discrepancy between the accuracy of both correlations is likely due to the approach that $\langle \alpha_{gs} \rangle$ is calculated. As shown in Eqs. (7) and (10), RELAP5 uses a more robust approach to calculate $\langle \alpha_{gs} \rangle$ based on the flow-regime transition criteria while TRACE determines $\langle \alpha_{gs} \rangle$ based on the mass flux.

The results in Fig. 3 highlight the inadequacy of the static correlations in predicting the interfacial area concentration for flashing flow. Even though the fundamental correlations used by RELAP5 and TRACE are modified from that by Ishii and Mishima,[9] their accuracies are significantly different, indicating that the correlations are highly sensitive to the closure models. The dependence of the correlations on flow regime transition criteria limits the dynamics of the correlations thus making them less suitable for flashing flow where the void fraction can undergo a significant increase in a short distance. Additionally, both correlations determine the interfacial area concentration of the flow through geometric relation with respect to the void fraction without considering the mechanisms that govern the sources and sinks of interfacial area. Furthermore, the idealized slug flow used to derive the correlations could be inaccurate for chaotic flows such as flashing. Given that the interfacial mass, momentum, and energy transfer terms in the two-fluid model are proportional to the interfacial area concentration, an inaccurate prediction would result in significant inaccuracies in the two-fluid model. Thus, another approach that can dynamically predict the change of interfacial area concentration through phase change, expansion, and bubble interaction mechanisms is needed.

Correction 3
Location: Section IV.A, Figure 3
Corrected image and caption:

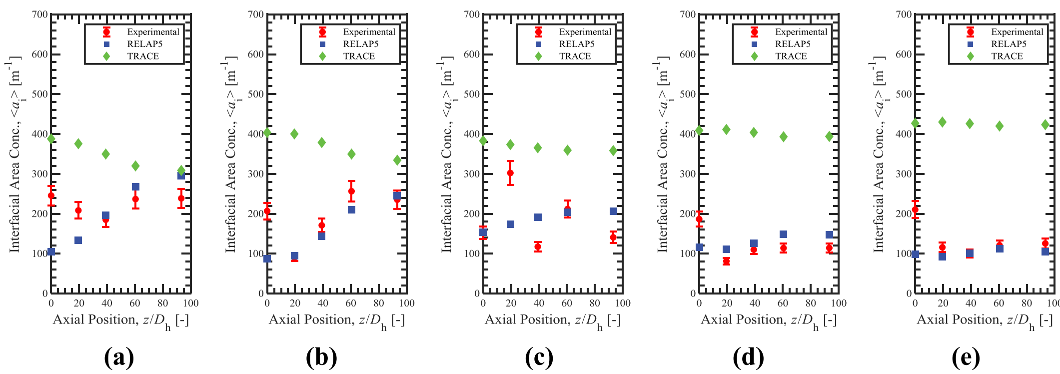

Fig. 3. Validation of RELAP5 and TRACE interfacial area correlations for the following pressure conditions: (a) low, (b) low, (c) intermediate, (d) elevated, and (e) elevated.

Correction 4
Location: Section IV.B, Paragraph 3
Corrected text:
In general, the one-group decoupled IATE overpredicts the interfacial area concentration, but the magnitude of overprediction is observed to reduce drastically as pressure increases.

Correction 5
Location: Section V, Paragraph 1
Corrected text:
The RELAP5 correlation is able to predict the interfacial area concentration more accurately than the TRACE correlation. The large discrepancy between the accuracies of both correlations, despite their fundamental similarities, indicates that static correlations are highly sensitive to their closure models, which are in turn dependent on flow regime criteria. The dependence of the static correlations on the flow regime map and the assumption of an idealized slug flow limit their application in highly chaotic flows such as flashing.

Correction 6
Location: Section V, Paragraph 2
Corrected text:
The one-group IATE is observed to overpredict the interfacial area concentration, but the magnitude of overprediction reduces as pressure increases.

Correction 7
Location: Captions of Figures 3 through 9
Corrected text:

Fig. 3. Validation of RELAP5 and TRACE interfacial area correlations for the following pressure conditions: (a) low, (b) low, (c) intermediate, (d) elevated, and (e) elevated.

Fig. 4. Validation of one-group decoupled IATE for the following pressure conditions: (a) low, (b) low, (c) intermediate, (d) elevated, and (e) elevated.

Fig. 5. Validation of one-group coupled IATE for the following pressure conditions with the Nusselt number correlations by Wolfert et al.[29]: (a) low, (b) low, (c) intermediate, (d) elevated, and (e) elevated.

Fig. 6. Comparison of the performance of the Nusselt number correlations for the following pressure conditions: (a) low, (b) low, (c) intermediate, (d) elevated, and (e) elevated.

Fig. 7. Validation of two-group coupled IATE with Γ_g models from RELAP5 using different length scales for the following pressure conditions: (a) low, (b) low, (c) intermediate, (d) elevated, and (e) elevated.

Fig. 8. Validation of two-group coupled IATE with Γ_g models from TRACE using different length scales for the following pressure conditions: (a) low, (b) low, (c) intermediate, (d) elevated, and (e) elevated.

Fig. 9. Validation of two-group coupled IATE with Γ_g from Park et al.[25]for the following pressure conditions: (a) low, (b) low, (c) intermediate, (d) elevated, and (e) elevated.